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ENGRAVINGS

OF THE

CARDIAC NERVES, THE NERVES OF THE NINTH PAIR, THE GLOSSO-PHARYNGEAL, AND THE PHARYNGEAL BRANCH OF THE PNEUMO-GASTRIC;

COPIED FROM THE

"TABULAE NEUROLOGICAE"

OF

Antonio Scarpa.

BY EDWARD MITCHELL, ENGRAVER.

WITH LETTER-PRESS DESCRIPTION,

TRANSLATED FROM THE ORIGINAL LATIN,

BY DR. KNOX,

LECTURER ON ANATOMY.

THIRD EDITION.

EDINBURGH:

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1832.

WELLCOME
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TO THE

GENTLEMEN ATTENDING MY ANATOMICAL LECTURES.

GENTLEMEN,

THE most flattering testimonial which can be adduced in favour of any work is its rapid sale. The merit, then, of these "*Engravings of the Nerves*," intended solely to aid you in your practical Anatomical Studies, is undoubted, since, long previous to the expiration of a year, a second edition has been called for. But success! that talismanic power, which palliates and obliterates a thousand follies, and a thousand errors in its fortunate possessors! success in literary undertakings, may be dependent on at least two causes,—the intrinsic original merit of the work, and, secondly, its general utility. Now, I feel inclined to claim for these Engravings,—and I do this the more boldly, that so little of the merit appertains to me,—a title to a reward for both qualities; to commendation as works of art and genius, and to encouragement and protection as works which, from their extremely moderate price, have already been, and must continue to be, eminently useful.

I beg of you, Gentlemen, to remember that these are the works of SCARPA, copied, it is true, but by a Master of the Art, and by one as competent to sketch from Nature as SCARPA himself. And if there be any so fastidious as to deem these moderate-priced quartos unworthy a place in his library, I request of him to reflect that they are not published as specimens of the Art, or as challenging the close inspection of the Amateur, but simply designed for the Dissecting Table and for the Anatomical Class-Room, so that the Student of Anatomy and of Physiology may have before him, at all times, a sketch, or accurate representation I should rather say, of some of the most important parts of the Human Body, whether he be himself at the moment engaged in the dissection of the parts, or merely listening to the description and observing the demonstration of his Teacher.

I think it impossible to misunderstand my object. No benefit accrues to me, directly or indirectly, by the sale of these Works: they were, it is true, suggested by me, and undertaken, and the labour and trouble cheerfully borne with, to put you in possession of useful works, on whose accuracy you might depend, so as to facilitate your acquisition of a science, than which the range of human invention offers none so eminently calculated to correct false systems of Philosophy, destroy the monstrous errors of ignorance and gloomy superstition, the delusions of speculative, prejudiced theorists, and to benefit mankind.

There are persons who indiscriminately censure and condemn Anatomical Drawings and Engravings, rating them as dangerous and bad ; and I well remember the time when I was one of these persons, because I had seen them substituted for actual dissection,—a destructive practice, and which, if persisted in, must necessarily prove ruinous to the reputation of the person as a Surgeon ; but I knew nothing at the time of the difficult duties of the Teacher of Anatomy,—how he must adapt his mode of instruction to the capacity of the individual student,—how some acquire knowledge most readily by description and demonstration, whilst to others a single glance at a diagram or drawing, compared at the same moment with nature, will at once convey the truth : And how again, to others, both methods must be adopted or put in force, before the difficult truths of Anatomy can be fully understood. Ample experience has taught me this ; and the constant approbation you have been pleased to bestow on my efforts, added to a success without a parallel in the history of anatomical teaching, convince me fully of my competency now to offer you, without presumption, my opinion on these matters.

If these remarks, Gentlemen, be just, they surely apply with equal, if not greater, force to those Engravings of the Arteries after Tiedemann, by Mr. Mitchell, with descriptive letter-press, and just submitted to you—a work of a similar nature to this, and likely to prove of still greater utility.

I have the honour to be,

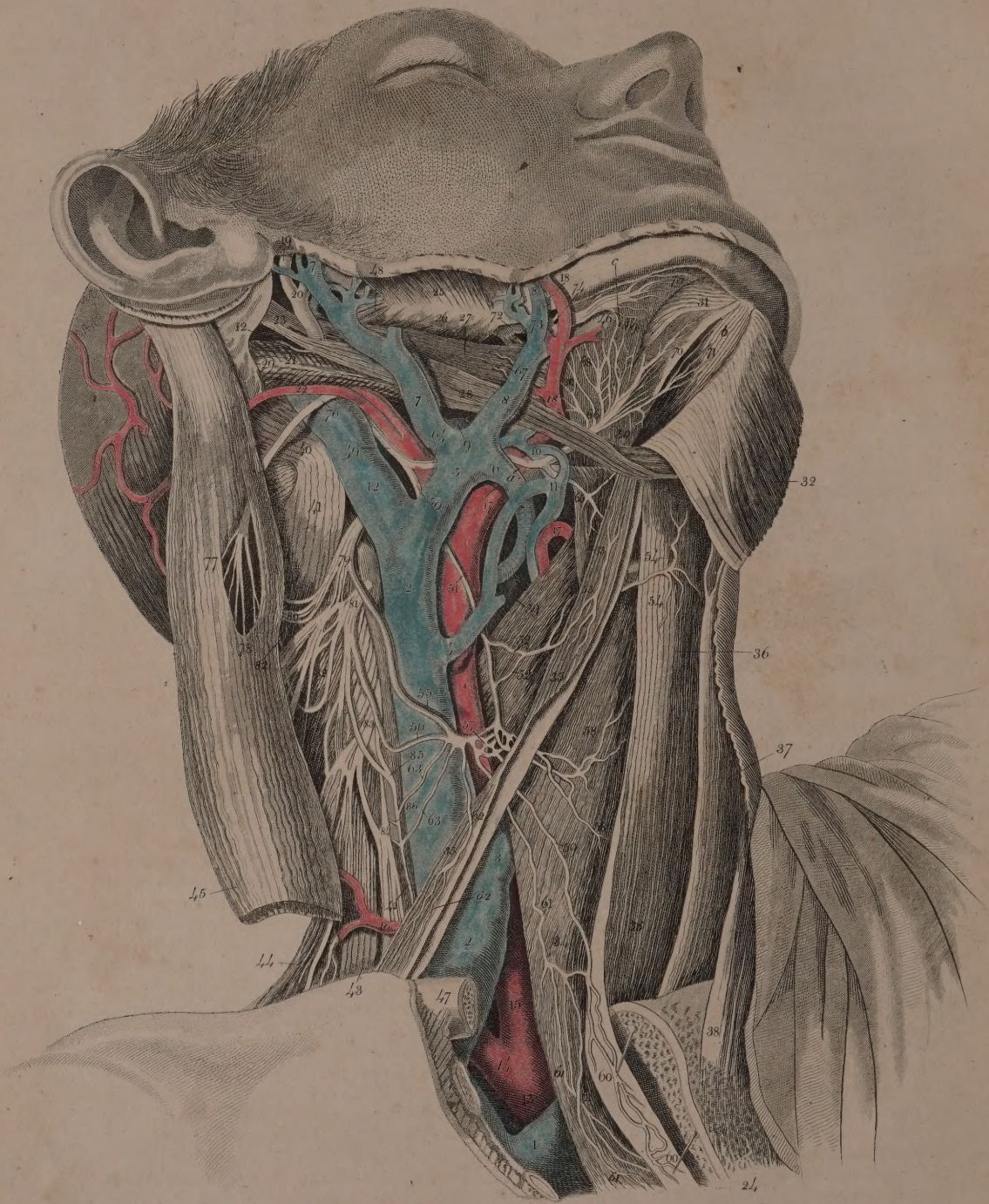
GENTLEMEN,

With the greatest regard and respect,

Your most obedient Servant,

R. KNOX.

PL.1.



E.Mitchell sculp.

PLATE I.

The Nerve of the Ninth Pair, or Great Hypoglossal.

1. The vena cava superior.
2. The internal jugular vein.
3. The *inferior* thyroid vein.
4. The pharyngeal vein.
5. The *superficial* trunk of the internal jugular vein. See WALTER's very beautiful Plates of the Veins of the Head and Neck. *Observ. Anat.*
6. *Superior* thyroid vein.
7. Temporal vein.
8. The vena transversalis of the face.
9. A vein running from the pharynx and the posterior fauces into the internal jugular.
10. Trunk of the *deep* lingual vein.
11. Anastomosis between the *deep* lingual and pharyngeal veins.
12, 12. Cerebral internal jugular vein.
13. Arteria innominata.
14. Right subclavian artery.
15. Right common carotid.
16. Transverse cervical artery.
17, 17. *Superior* thyroid artery.
a. The lingual artery. As is frequently the case, it arose in this particular subject from a trunk common to it and the *external* maxillary.
18. *External* maxillary or *labial* artery.
19. Temporal artery.
20. *Internal* maxillary artery.
21. Auricular artery.
22. Occipital artery.
23. Styloid process of the temporal bone.
24. The manubrium of the sternum divided longitudinally.
25. Masseter muscle.
26. *Internal* pterygoid muscle.
27. Stylo-glossus muscle.
28. Stylo-hyoideus muscle.
29. Posterior belly of the digastric muscle.
30, 30. Hyo-glossus muscle.
31. Genio-glossus muscle, the deeper fibres of which are carefully separated.
b. Genio-hyoideus muscle.
32. The mylo-hyoideus muscle detached from the right side of the lower jaw, and turned aside.
33. Hyo-thyroid muscle.
34. Sterno-thyroid muscle.—I constantly find the fibres of this muscle much expanded in the region of the thyroid gland; so much so, indeed, as to cover the whole or the greater part of the horn of this body.
35, 35. Omo-hyoideus muscle.—In this plate each of its fleshy bellies is carefully drawn aside, to bring into view the nerves entering its substance.
36, 36. Sterno-hyoideus muscle of the right side.
37. Part of the left sterno-hyoid muscle.
38. The origin of the left sterno-mastoid muscle from the sternum.
39. The pharynx.
40. Obliquus capitis superior.
41. The superior attachment of the levator scapulae muscle.
42. Portion of the scalenus anticus muscle.
43. Superior part of the scalenus posticus.
44. Part of the trapezius.
45. The right sterno-mastoid muscle detached from the sternum.
46. Sublingual gland.

47. Right clavicle.

48. The stylo-maxillary ligament. This is a portion of that ligament which SANTORINI called *new.—Obs. Anat.* cap. vi. § xx. but WEITBRECHT chose rather to call it the *suspensory ligament of the stylo-glossus muscle.—Syndesm.* Sect. vi. § 7.; and he has very accurately delineated it in Tab. viii. fig. 32. In our plate this ligament wants all that part which, being stretched over the stylo-glossus muscle like a web, strengthens and supports its origin.

49. The nerve of the ninth pair, or great hypoglossal.

The great hypoglossal nerve, as soon as it has emerged from the cranium, adheres to the pneumo-gastric by means of close cellular texture, and even sometimes by giving and receiving nervous filaments. Vid. our Commentary de Nerv. Accessor. in Actis Acad. Vindobon. Tab. x. Fig. ii. *e.* Fig. iv. *f. g*, § V. *f.* vii. *e.* Asch. *de primo pari cervicalium*, Tab. iii. Fig. iv. 13. This communication of the hypoglossal with the pneumo-gastric nerve was remarked by that excellent anatomist FALLOPPIUS, as is evident from his words, which we subjoin.

"*For*, (says he,) *having preserved its body whole and round, it runs downwards to the tongue; but before it recedes from its connexion with the sixth pair*, (pneumo-gastric with us,) *it communicates with it sometimes by a single and sometimes by a double twig.*"—Observ. Anat. page 155.

After this the hypoglossal always receives a remarkable branch from the first cervical, or from that arched branch by which the first is joined to the second of the cervical nerves. Vid. Plate II. 63, of this work; also our Commentary de Nerv. Accessor. Tab. x. Fig. 1. 27; NEUBAUER, *Descript. Nerv. Cardiac.* Tab. ii. Fig. 1. 99.—Having received this branch, the trunk of the hypoglossal runs downwards and outwards between the internal jugular vein and occipital artery, and after turning round the latter, it inclines towards the tongue. At the place where it turns round the occipital artery, the hypoglossal gives off a remarkable branch, which is generally called

50. The descending branch of the ninth pair, (Descendens noni) and by some *the internal descending nerve of the neck.* GALLEN called it *parva particula septimæ conjugationis. De Nerv. Dissect.* cap. 8. EUSTACHIUS was the first who, with any appearance of truth, delineated the *descendens noni.*—Tab. xviii. 12. For VESALIUS' plates of the hypoglossal nerve are rude, nor are those published by WILLIS and VIEUSSENS much better. But VIEUSSENS has also erred in ascribing the *descendens noni* to the pneumo-gastric.

51. The course of the descendens noni above the common carotid, and then between it and the trunk of the facial and pharyngeal veins.

52, 52. Two branches from the descendens which unite into one, and, re-dividing immediately after, are distributed to the superior belly of the omo-hyoideus, and to the sterno-hyoideus.

53. One of the preceding branches distributed to the upper part of the omo-hyoideus.

54, 54. The other branch going to the upper part of the sterno-hyoideus muscle.

The divisions of this branch run upwards and downwards among the fleshy fibres of the sterno-hyoid muscle.

55. A nerve from the second cervical joining with the descendens noni. It is called *the external descending nerve of the neck*, by ANDERSCH, in his *Fragmentum Operis Neurclog.* page 101.

56. Another nerve of the same order given off from the third cervical, and joining the *descendens.*

57. A nervous plexus resulting from the anastomosis of these branches, from the second and third cervical nerves, with the *descendens noni.* From this union of the spinal and cerebral nerves arise all those which are distributed to the muscles which depress the hyoid bone and larynx, viz. the sterno-hyoid, the sterno-thyroid, and omo-hyoid. This is not the only instance in the human body where a peculiar set of nerves is destined by nature to a particular order of muscles. For, in addition to the just mentioned distribution of the descendents with some of the cervical nerves, we may look how the extensor muscles of the leg are supplied altogether, or in a great part, by the anterior crural nerve, the flexors by the great ischiatic, and the adductors by the obturator nerve; the flexors of the foot and toes by the posterior tibial nerve, the extensors by filaments from the fibular. Nearly the same thing is observed in the arms. Does not this peculiar distribution of nerves to distinct and particular orders of muscles contribute to the simultaneousness and equa-

lity of the motions which are excited by several muscles of the same action? The thing, indeed, has some appearance of truth.

But with regard to the number and origin of the cervical nerves which unite with the *descendens*, there exist many varieties: For the descendens is sometimes increased by two branches from the first and second, which are late of joining together, whilst at other times they unite into one cord a little below their origin. At one time these nerves arise from an arch of communication between the second and third cervical spinal nerves; at another from the union of the third with the fourth. Nor is it very rare for some other filaments from the fourth and fifth cervicals, although very small, to join with these nerves,—as may be seen in this plate under the numbers 63, 63.

58. Two branches coming from the union of the *descendens noni* and certain cervical nerves; which, gradually diverging from each other, enter, by a serpentine course, the middle fibres of the sterno-thyroid muscle. Nerves generally, and especially those which are more slender than others, assume this flexous course; but this is more conspicuous in those nerves which are distributed to parts or muscles subject to frequent contractions and strong efforts; this peculiarity is also common to blood-vessels of the same parts.

59. A very long nerve distributed to the posterior surface of the sterno-hyoideus.

60, 60. Smaller branches of the same nerve continued down under the sternum, towards the origin of the sterno-hyoideus, and carefully displayed.

61, 61, 61. Another nerve from the plexus of the cervical nerves and the descendens noni, accompanying it, and winding on the anterior surface of the sterno-thyroid muscle. From this nerve there sometimes arises a twig which runs behind the clavicle along with the phrenic nerve. Haller and Wrisberg say that this anastomosis is frequent; we have seen it sometimes, but not so often, although for several years we have dissected the nerves of the throat by no means superficially.

62, 62. Another nerve to the omo-hyoideus, which, arising from the plexuous anastomosis of the *descendens noni* with the superior cervicals, is distributed to the posterior surface of the lower belly of the omo-hyoid muscle. On this head it is proper to premise that in those subjects in which the middle tendon of the omo-hyoideus is longer and more slender than usual, the nerve of which we speak runs in a groove deeply marked in the tendon, to a pretty great extent, so that it might seem wanting to a person not very attentive.

63, 63. Two very slender nervous filaments from the fourth and fifth cervical nerves, which having at first run downwards behind the internal jugular vein, are by and bye reflected upwards to increase the plexus of the *descendens* and cervical nerves. These filaments, although generally found, easily escape the view if the internal jugular vein be collapsed and empty of blood or injection.

When I consider the numerous connexions of the great hypoglossal with the cervical nerves, there appears to me to be some similarity between it and the great sympathetic; for the hypoglossal always receives branches of communication from the first, second, and third cervical nerves, and sometimes from the fourth and fifth. This great extent of communication with the spinal marrow is not much less than that which the sympathetic has in the upper part of the neck; and in the remarkable distribution of the hypoglossal to the arches of the throat, this extent is perhaps greater. There is, however, a great discrepancy between them, inasmuch as the hypoglossal is distributed to organs of voluntary, whilst the sympathetic is for the most part distributed to those of involuntary motion.

64, 64. The trunk of the great hypoglossal nerve. Its course between the great veins and arteries of the neck is remarkable, as also are its two flexures, viz. one around the occipital artery, the other near the external maxillary. By this simple contrivance, the trunk of the great hypoglossal, running downwards and forwards to the tongue, is so nicely retained in its situation, that it is not disturbed in its seat, either by unusual extensions of the head, or flexions to either side. Some small veins going from the pharynx to the internal jugular vein also contribute something to this office.

65. A small nerve from the trunk of the hypoglossal, near its second turn, going to the hyo-thyroid muscle.

The trunk of the hypoglossal, after its first flexure, and the giving off of the *de-*

cendens until the origin of the nerve to the hyo-thyroid muscle just mentioned, gives off no branch that we know of.

Andersch, a late very diligent dissector of nerves, makes mention of a certain branch *from the transverse part of the trunk* of the hypoglossal, communicating with the *nervus mollis twisted round the superior thyroid artery*, and of a second small nerve *from the transverse nervus mollis of the external carotid artery inserted into the hypoglossal.*—Fragment. Neurol. § xxxv. We frankly confess that, although we have often sought for it, we never could find this anastomosis of the *nervi molles* of the superior cervical ganglion of the sympathetic with the trunk of the great hypoglossal.

66. A series of small nerves arising from the concavity of the second flexure of the hypoglossal. This elegant distribution of the nerves being stretched over the hyo-glossus muscle, sends branches to it and the stylo-glossus, accompanied by the lingual branch of the fifth pair.

The description of the nerves published by Boehmer agrees entirely with our plate. "These several branches," says he, "arise from the upper part of the trunk, and they are so united among themselves by intermediate twigs, that they have the appearance of a remarkably reticulated plexus. Several of these branches are inserted into the middle and superior part of that portion of the hyo-glossus arising from the cornu of the hyoid-bone; another sends its twigs to the superior fibres of that part of the muscle attached to the base of the same bone; lastly, another, and that generally the largest, being joined with the first branch of the lingual nerve of the fifth pair, is distributed in two divisions to the upper part of the portion of the hyo-glossus attached to the horn of the hyoid bone."—*De Nono pari Comment.* § 49. Andersch called this reticulated series of nerves, the *Cerato-basio-stylo-glossal plexus.*—*Loc. Cit.* § xxxviii.

67, 68. Nervous filaments to the superior fibres of the hyo-glossus and stylo-glossus muscles.

69. A double anastomosis of the great hypoglossal with the *lingual* branch of the fifth pair. This anastomosis is sometimes simple, but then it is formed by a thicker branch. In every case this union is only with the first or last nervous twigs of the *lingual* branch of the fifth pair, at least we think that union very rare, which Meckel has delineated between the branch of the maxillary ganglion and great hypoglossal.—*De quinto pare*, Fig. 1. 76. We think that in the following words Falloppius meant to point out this anastomosis: "When the seventh nerve" (the great hypoglossal with us) "has arrived at the tongue, its smaller portion is distributed to the muscles of that organ and the os hyoides, whilst its larger branch is all spent in the substance of the tongue, and runs as far as its apex; some of its filaments seem to be mixed with those of the third branch of the fifth pair, which is in like manner distributed to the tongue."—*Obs. Anat.* p. 155.

Whether these nerves run, from the *lingual* branch of the fifth to the hypoglossal, or from the hypoglossal to the fifth, no one has mentioned. Whichever be the way, it is nevertheless worthy of attention, that of the five immediate organs of the senses, two only, viz. taste and touch, maintain a communication with the extremities of the nerves, whilst the rest are not joined with those nerves which are called auxiliary to their organs.

For the filaments of the olfactory nerve, distributed to the septum of the nose and superior spungy bones, nowhere mix or join with the twigs of the ophthalmic or superior maxillary nerves, although they run very near and close to them. The ciliary nerves are nowhere connected with the optic nerve or the retina; nor have those filaments of the portio dura, described by Wrisberg, which run so close and near to the acoustic nerve, through the meatus auditorius internus, any connexion with the immediate organ of hearing.

c. Some nervous filaments from the cerato-glossal plexus of the hypoglossal, inserted under the sublingual gland into the fleshy texture of the tongue, which is on its margin, and which seems to be the continuation of the stylo-glossus muscle.

70. The extremity of the trunk of the hypoglossal divided into branches and disseminated through the deeper fibres of the genio-glossus muscle, the direction of whose fasciculi it intersects. Now, the filaments of this nerve, which are very slender, after having abundantly supplied the genioglossus, accompany in such a plexuous and intricate manner the lingual artery to the apex of the tongue, that Haller and Meckel have rashly accused Vieussens of an

error on this subject. However, these filaments of the hypoglossal nerve do not reach the papillary surface which is at the apex of the tongue, but vanish altogether in the fleshy fibres which are immediately under. Moreover, it must not be overlooked that there is sometimes present a nervous branch which maintains a communication between the two trunks of the hypoglossal, where each of them is about to pass under the substance of the genio-glossus muscle. This is the same branch which ANDERSCH called the *transverse arch*. Loc. cit. § xxxvii.

71. A twig of the hypoglossal sent to the genio-hyoideus.
72. The lingual nerve from the third branch of the fifth pair (*gustatory.*)
73. The nervous filament, which the gustatory nerve sends to the submaxillary gland, cut.
74. Branch from the gustatory nerve to the sublingual gland.
75. Nervous filaments of the gustatory nerve, which, running between the fibres of the stylo-glossus and the genio-glossus muscles, are afterwards turned forwards, separated, and contracted, then, becoming more slender the nearer they approach the apex of the tongue, they at last distinctly end in the papillary stratum, which is nearly in the middle of that organ anteriorly, but chiefly in those close papillae which beset its apex and anterior margins. That in the apex of the tongue and in its margins, nearly to the middle of the whole length of this organ, the sense of taste resides; and that beyond this situation, as far as the base of the tongue, there is present no sense of taste, or at least a very obtuse one, is proved not only by anatomy, but in a wonderful manner by the experiment lately performed on man by my illustrious colleague ALEXANDER VOLTA, Professor of Natural Philosophy. He directs a plate of zinc to be applied to the apex or margins of the tongue, and a silver spoon to be laid on its dorsum beyond its middle; then to bring the handle of the spoon into contact with the plate of zinc. At the very moment the metals touch each other, a distinctly acid taste is impressed on the apex and margins of the tongue, which continues as long as the metals remain in contact. There, however, arises no sensation of taste in the base of the tongue. But it should not be suspected that the silver is incapable of conveying to and impressing the electrical irritation on the tongue; for by reversing the application of the metals, so that the silver may touch the apex or either margin of the tongue, and the zinc the base of it beyond its middle, as soon as the metals touch each other, a sharp, burning, bitter and alkaline taste is excited in the apex or margins of the tongue, whilst none is perceived at the base where the zinc lies. From this it is evident, that the principal and exquisite organ of taste resides in the apex and margins of the tongue, anterior to its middle; but that the base and root of this organ are only endowed with the sensation of common tact. By using this very simple apparatus, any one may prove on himself, that in proportion as he transfers the zinc or the silver from the apex or margins nearer to the dorsum and root of the tongue, the acuteness of taste is gradually diminished.

Although in our times, after the accurate dissections of the hypoglossal and fifth pair, physiologists no more doubt that the hypoglossal nerves serve chiefly for the motions of the hyoid bone, and the lingual branch of the fifth pair for the sensation of taste,—but in order to confirm and illustrate this fact more fully, I think it proper to insert here two medical cases, viz. one of a woman, the other of a man, in whom speech and the motions of the tongue were wanting, whilst in both an exquisite sense of taste remained.

A woman was subject to epileptic affections from her youth, which misfortune was incautiously attributed by the surgeon to a retropulsed herpetic eruption of the head. A little after parturition she was seized with hemiplegia and paralysis of the tongue. Proper remedies being immediately administered, she first regained her speech and afterwards the use of her joints. Some years afterwards she was again confined, and was a second time affected with hemiplegia and loss of speech, which disorders were not removed with the same success as at first; for although she recovered the use of her joints, she never recovered the power of moving the tongue and the faculty of speech. When I first saw this woman, about twelve years after her second confinement, she enjoyed in the best manner her internal and external senses, and was very cheerful in the society of men, but was incapable of articulating any words but the monosyllables of affirmation and negation, which

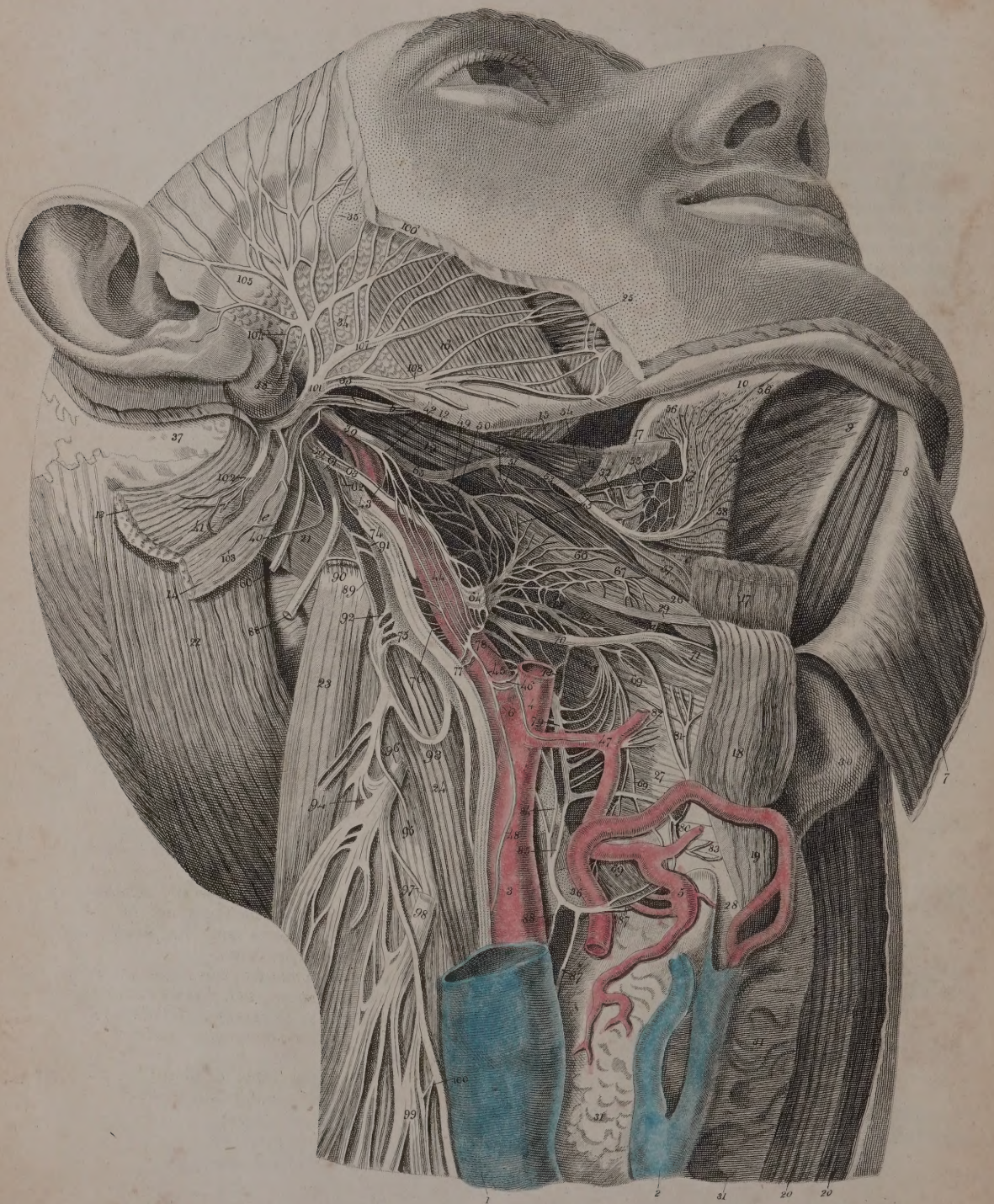
she aspirated in a harsh and dissonant tone. I ordered her to exercise her tongue, which, when with great efforts she tried, she could not do; and having applied my hand to those muscles which are betwixt the tongue, the chin, and hyoid bone, I found they were scarcely or not at all swollen by these endeavours. Having opened her mouth, the tongue appeared flaccid and flat, like some inert body, and retracted towards the isthmus of the fauces. The patient nevertheless masticated and swallowed pretty easily. The sense of taste was entire and acute; for the woman accurately appreciated all sorts of meat and drink; she shewed by her gestures that she immediately distinguished the smallest differences in the most delicate dishes, which less attentive tasters easily neglected. We made several trials, the woman being ignorant of our intention, which were sufficient to have detected any fraud that might have been practised by the patient.

A carpenter, sixty years old, had, without any manifest cause, been affected twenty-four years ago with an epileptic fit. He lost the power of speaking for ten days, which he recovered without any medicine. Two years ago, in the month of March, he was seized with a sense of weight at the base of the tongue, difficulty of speaking, and an unusual flow of saliva. He could afterwards articulate no more words; but the sense of taste remained as acute as before. He wanted the power of protruding the tongue, which appeared collapsed and flat; he, however, swallowed pretty freely. Electricity was tried, by passing the current from the lower part of the occiput to the *fræenum linguæ* and chin. After the first trials the patient began to feel himself better, and when we entertained great hopes of a cure, the old man, of an impatient and rude disposition, left the hospital secretly.

We have frequently admired the very accurate observations of Galen on the subject of the nerves of the tongue, which we think eminently useful either to the theoretical or practical physician. We subjoin it in his own words. He says, "As the motion of the tongue may be corrupted by the seventh conjunction of the nerves, (*hypoglossal with us,*) so may the sensation be impeded by the third (*third branch of the fifth pair with us,*) which dissectors call the soft nerve; it descends and is dispersed (as you know) in the coat which covers the tongue, whilst that which arises from the seventh conjunction is distributed to the muscles moving it. We sometimes see the sense of taste, and along with that, of touch, vitiated. For taste does not use one nerve and touch another. The nerves from the third conjunction having not only the power of touch, but of taste also. Yet the faculty of taste is more frequently injured than that of touch, although each is owing to the same nerves. For, indeed, taste requires an exact judgment, it being a more tender, whilst touch is a grosser sensation. But the power of moving the tongue comes from the seventh conjunction of nerves arising from the brain, not far from the commencement of the spinal marrow. From the appearance of the face, the tongue alone seems frequently to be affected with paralysis, when there is no lesion either of touch or taste. The cause of this is not obscure, especially to you who have not only seen the course of the nerves from the anterior part of the brain to the face, but also those from the posterior to all the parts of the animal below the face, and also to the muscles of the tongue, to which they impart voluntary motion. Therefore, when the anterior part of the brain only is affected, the motion of the tongue will not be impeded by the disease: but all the other parts of the face, on the right or the left side, lose both sense and voluntary motion."—*De Loc. Affect.* Lib. IV. cap. 2.

76. The spinal accessory nerve.
77. Some filaments of the spinal accessory nerve distributed to the fleshy fibres of the sterno-mastoid muscle.
78. The spinal accessory nerve running towards the shoulder to the trapezius muscle.
79. Second cervical nerve.
80. Anastomosis between a branch of the second cervical nerve and the *greater external* branch of the spinal accessory.
81. Third cervical nerve.
82. Anastomosis of the third cervical nerve with the *greater external* branch of the spinal accessory.
83. Fourth cervical nerve.
84. Fifth cervical nerve. The upper part of the brachial plexus.
85, 85. Phrenic nerve.
86. Third root of the phrenic nerve, arising in this subject by a short and double branch from the fifth cervical nerve.

PL. II.



E. Mitchell, sculpt.

PLATE II.

The Glosso-Pharyngeal Nerve, and the Pharyngeal Branch of the Pneumo-Gastric.

1. The *internal* jugular vein cut.
2. *Inferior* thyroid vein.
3. Common carotid artery.
4. The *external* carotid, cut at its commencement.
5. *Superior* thyroid artery.
6. *Internal* or cerebral carotid artery.
7. The mylo-hyoideus detached from the right margin of the lower jaw.
8. Genio-hyoideus muscle.
9. Genio-glossus.
10. The tongue.
11. Stylo-glossus muscle.
12. The stylo-pharyngeus muscle carefully raised and thrown aside, that the *glossopharyngeal* nerve, which lies under it, might come into view.
13. The posterior belly of the digastric muscle cut and thrown aside.
14. Stylo-hyoideus muscle.
15. Internal pterygoid muscle.
16. Masseter muscle.
17. The hyo-glossus muscle raised from its seat and cut at its origin.
18. Hyo-thyroid muscle.
19. Crico-thyroid ——
20, 20. The sterno-hyoid and sterno-thyroid muscles of the left side.
21. Obliquus capitis superior.
22. Splenius capitis.
23. Superior head of the levator scapulae.
24. Rectus capitis anticus major muscle.
25. Buccinator muscle.
26. *Superior* constrictor of the pharynx.
27. *Middle* constrictor of the pharynx.
28. *Inferior* constrictor of the pharynx.
29. Right horn of the hyoid bone.
    a. The ligament connecting the apex of the great horn of the hyoid bone with the superior process of the thyroid cartilage.
30. Thyroid cartilage.
31. Thyroid gland.
32. Right tonsil.
33. Styloid process of the temporal bone.
    b. The ligament which is stretched between the angle of the lower jaw and the apex of the styloid process. *(Stylo-Maxillary ligament.)* *Vid.* Tab 1. 48.
34. Part of the parotid gland.
35. Zygomatic process.
36. Intervertebral cartilages of the neck.
37. Mastoid process of the temporal bone.
38. Cartilaginous part of the meatus auditorius externus.
    c. Mucous follicles of the membrane of the mouth under the base and root of the tongue.
    d. Fleshy texture of the tongue under the hyoglossus muscle.
39. The *Glossopharyngeal* nerve. The stylo-pharyngeus muscle, as above mentioned, was, in this dissection, carefully removed and thrown aside, that the trunk of the *glossopharyngeal* nerve and its branches might be more easily shown.

    Concerning the origin of this nerve, and its exit from the cranium, *vid.* SOEMMERING *de basi Encephal.*; WRISBERG *Sylloge Comment. Anat. Commentarium nostrum de Nerv Accessor.*

    FALLOPPIUS has rashly attributed the discovery of this nerve to himself, although GA-

LEN mentioned it, and, what is remarkable, distinguished it from the Pneumogastric.

40. The first branch of the *glossopharyngeal*, just at its exit from the cranium, forming an anastomosis with

41. The *digastric* branch of the *communicating nerve of the face.* Vid. HALLERI *Fasc. Anat. Tab. art. Maxillar. intern. b.* NEUBAUERI, Tab. ii. Fig. 1. 76.

42. Another branch of the glossopharyngeal joined with the *pharyngeal* nerve of the pneumogastric.

43. Two branches of the *glossopharyngeal* dividing into several smaller filaments, and descending on the *internal* carotid artery. In this course they accompany the *nervi molles* of the superior cervical ganglion of the sympathetic, which twine round the *internal* carotid, 76, 77.

I think NEUBAUER wished to shew the same thing in Tab. ii. Fig. 1. 77. 81.

44. Other two small nerves of the same order and origin, running to the ganglion and plexus of the *pharyngeal* nerve of the pneumogastric.

45. A nervous cord formed by the union of several filaments of the *glossopharyngeal*, and receiving some fibrils from the *nervi molles* of the superior cervical ganglion. 76, 77.

46. Nervous filaments resulting from the union of twigs of the *nervi molles* and *glossopharyngeal*, going to the division of the common carotid.

47. A nervous twig of this order running along the superior thyroid artery.

48. A nervous filament composed of nervi molles and twigs of the *glossopharyngeal*, which runs downwards over the common carotid artery to the *superficial cardiac* nerve.

49. A pretty thick branch of the *glossopharyngeal*, which, along with

50. A plexuous expansion of the pharyngeal branch of the pneumogastric, is distributed to the *superior* constrictor muscle of the pharynx; and being joined with

51. *Circumflex* branches of the *glossopharyngeal* and other twigs from the same origin, supplies the stylo-pharyngeus muscle.

52. A remarkable branch of the *glossopharyngeal*, from which arise

The *proper* nerves of the stylo-pharyngeus muscle, and other circumflex branches to it; also some which are inserted into the *superior* constrictor muscle of the pharynx.

53. The *smaller external lingual* branch of the *glossopharyngeal.* This nerve is sometimes composed of two or three *circumflex* branches.

54. Another smaller lingual branch of the *glossopharyngeal*, not constant.

55. The *circulus tonsillaris* of ANDERSCH, or plexuous anastomosis of the *smaller external lingual* branch, with twigs given off from the concavity of the extremity of the trunk of the *glossopharyngeal.* Some very slender filaments arising from this plexus go to be distributed to the tonsil. Concerning this plexus, *vid.* ANDERSCH. *Fragment. Neurol.* WRISBERG. *Comment. de Nervis Pharyngis*, § ii.

56. 56. *Lateral lingual* branches of the *glossopharyngeal.* They are distributed to the margins of the root of the tongue. MONRO has not described these nerves with sufficient accuracy.—*Observations on the Nervous System.* Tab. xxvi. M. In writing of these nerves, ANDERSCH says, "I have carefully traced all these nerves through the substance of the tongue, into those numerous papillæ which are not far removed from the large and strong ones, extending in a straight line, at no great distance from the right margin of the tongue, on its upper surface."—*Fragment. Neurol.* pag. 15. WRISBERG (loc. cit. § 12.) affirms the same thing. It is indeed true that these nerves are distributed under the form of very slender filaments to the membrane covering the posterior margin of the tongue.

57. Two filaments of the glossopharyngeal, which are partly distributed to the superior constrictor of the pharynx, partly to the glandular membrane covering the epiglottis.

58. *Deep lingual* branches of the *glossopharyngeal* nerve. These, like the *lateral lingual* branches, after having passed through the fleshy texture of the tongue, go to that part of the surface of that organ which extends from its root to about an inch before the foramen cœcum. The celebrated WRISBERG says, "that these deep branches of the glossopharyngeal are dispersed through the muscular fibres of the tongue."—Loc. cit. § 12. Now, although we have always laid, and do lay great stress on the authority of this illustrious man, still we cannot on this occasion distrust our own senses, and we are compelled to affirm, that all the *deep branches* of the *glossopharyngeal* nerve terminate in the surface

of the tongue; none or but very small filaments are in their course given to the muscular texture of that organ.

Indeed, whoever has once considered the course and distribution of the *lingual* branch of the fifth pair, could not but perceive, that it, the immediate organ of taste, does not begin to resolve itself into gustatory filaments, and to go to the surface of the tongue, sooner than about an inch anterior to the *foramen cæcum:* and that from that point each set of filaments first turn themselves towards the apex of the tongue.

Therefore the whole part of the tongue which extends from its root to the first division of the *lingual* branch of the fifth pair, is quite deficient in the sensation of taste.

But this part of the tongue is copiously supplied with nerves on the sides, and in the middle by the *glossopharyngeal;* because the extremities of these nerves end most assuredly in the glandular substance of the thick membrane which invests the root of the tongue, and in those tubercles which, under the appearance of papillæ, arise around, and a finger's breadth before the *foramen cæcum*, it has appeared to some very like the truth, that the *glossopharyngeal* nerve was as it were another instrument, in addition to the *lingual* branch of the fifth pair, destined to produce taste.

Nevertheless, it is placed beyond all doubt, that most of those tubercles at the root of the tongue are not gustatory papillæ, but granular bodies, and that almost none of the cylindrical and fungiform papillæ, of which there is a great number at the apex and anterior margins of the tongue, exist in the middle and margins of the root: moreover it is evident, by certain experiments, that the root of the tongue does not distinguish the qualities of sapid bodies. Wherefore, it is more consonant to truth, to say, that the glossopharyngeal nerve, if by chance it rises up in some papillæ around the base of the tongue, does nevertheless bestow no faculty of taste there, or at least so very imperfect, that it might with greater justice be referred to that common tact, considered in its widest sense, of which the skin among other parts has a great share. Nor indeed do those examples of the taste remaining when the tongue has been almost removed to its root, and the fact, that some power of tasting has remained in the soft palate, and even in the œsophagus itself, much invalidate the opinion; since it has been proved to be certain, that some sensation has been excited in these parts, only however by very acrid substances; but it is so obscure and uncertain, that it does not deserve the name of taste, the sensation being so different from that exquisite one which is experienced at the apex and anterior margins of the tongue.

59. Spinal *accessory* nerve.

60. *Greater external* branch of the spinal *accessory* nerve.

61. *Smaller internal* branch of the spinal accessory, from which the *pharyngeal* nerve, by and bye to be pointed out, receives one of its roots.

62. Another deep anastomosis between the *smaller internal* branch of the spinal *accessory* and *pneumogastric.*

63. *Pharyngeal* nerve of the *pneumogastric.* We have found no one who, before Fallopius, has made mention of this nerve. For, in treating of the Pneumogastric, he says, " it transmitted some slender twigs, sometimes double but sometimes separated from each other, to the muscles of the fauces, but of these it sends one more remarkable to the muscle arising from the larynx and surrounding the gullet."—*Observ. Anat.* page 152. Haller has, although in a few words, accurately embraced the history of all this nerve.—*Elem. Phys.* Lib. x. Sect. vi. § xix. See also Wrisberg, *Comment. Anat. de Nervis Pharyngis*, § 15. The origin of the pharyngeal nerve from the trunk of the eighth pair being diligently sought for and displayed, appears distinctly double; one origin, namely, from the *smaller internal* branch of the spinal accessory, the other from filaments of the pneumogastric. May not this formation of the *pharyngeal*, at its commencement, from filaments of the spinal accessory and pneumogastric, throw some light to enable us to follow with some degree of sense what Galen says de *Loc. Affect.* Lib. v. cap. 5. " that all those who have some painful affection in the throat, also distinctly complain of a pain in the back?" Let physicians look to this.

Moreover, the *pharyngeal* nerve, retaining, for a long time after its origin from the pneumogastric, the appearance of two branches joined together, runs up over the cerebral carotid, on which it enters into an anastomosis with the *glossopharyngeal*, No. 42., being afterwards covered by some longer filaments which the glossopharyngeal nerve sends over the internal carotid,

Nos. 43, 44, it runs obliquely downwards and forwards to the pharynx; and when it has arrived at the upper part of the *middle* constrictor, the two filaments of the *pharyngeal* nerve separate a little from each other, and are expanded into a *gangliform* plexus.

64. The *gangliform* plexus of the *pharyngeal* nerve lying on the upper part of the *middle* constrictor of the pharynx.

Wrisberg has described this structure very correctly.

"Now, having run farther forwards, the filaments of the *pharyngeal* nerve are a little separated from each other, so that they begin to be hid by some of their fibres inclining a little downwards. After having received, at the upper and anterior margin, the second communicating branch from the *glossopharyngeal*, the pharyngeal nerve swells into a knob very like a ganglion, which is properly called *pharyngeal*."—*Comment. Anat. de Nerv. Pharyng.* § 7. Haase (Program. *de Nervo Phrenico dexteri lateris.*) calls it the *gangliform part of the pharyngeal nerve.*

65. *Ascending* branches from the *gangliform* plexus of the *pharyngeal* nerve distributed to the superior *constrictor* and upper part of the pharynx.

66. Some filaments of the *pharyngeal* nerve, accompanied by some from the *glossopharyngeal.*

67. Twigs of the pharyngeal nerve, first running upwards and then downwards, to be inserted partly into the *superior* constrictor and partly into the *middle* constrictor of the pharynx.

68. A remarkable branch of the pharyngeal nerve called *descending.*

69, 69, 69. Pencilliform filaments of the *descending* branch of the pharyngeal nerve disseminated among the fibres of the *middle* and *inferior* constrictors of the pharynx.

70. Anastomosis of the *descending* branch of the *pharyngeal* with the *external laryngeal* nerve of the sympathetic.

71. *Internal laryngeal* nerve of the pneumogastric.

72. Anastomosis of the *internal laryngeal* with the pharyngeal nerve.

73. Anastomosis of the *internal laryngeal* nerve with one of the *nervi molles* of the superior cervical ganglion of the sympathetic. From this anastomosis the *external laryngeal* nerve arises.

74. The *gangliform* trunk of the pneumogastric where it first leaves the cranium.—Pfeffinger (*De Struct. Nerv.* Sect. 11. § xxx.) calls it "Truncum octavi tumidulum."

There are some who attribute the discovery of this gangliform body of the pneumogastric to Falloppius; but there is nothing, I think, more certain than that Falloppius described in this place the *superior cervical* ganglion of the sympathetic, which is closely bound to the trunk of the pneumogastric. Be that as it may, this discovery belongs to Willis, who, long ago, made this remark on Falloppius,—"Either the trunk or a branch of the sympathetic nerve is joined to the trunk of the pneumogastric; for it there seems to enlarge into a tumor like a ganglion or hard body: This, although oblong, is called by Falloppius an olivary body. Sometimes this author says, there is one, sometimes two, present on this nerve; there is indeed always one on the trunk of the pneumogastric, and another on the sympathetic, which is next it."—*Nerv. Descript.* cap. xxiii.

Vieussens has pretty accurately delineated this swelling of the trunk of the pneumogastric.—*Neurog. Univers. Tab. Nerv. Octav. et Intercost.* H. H.

75. Superior cervical ganglion of the sympathetic.

76. *Nervi molles* arising from the superior cervical ganglion of the sympathetic.

77. Two filaments of the *nervi molles* of the superior cervical ganglion of the sympathetic, running round the internal carotid artery, and uniting with twigs sent from the *glossopharyngeal* over the same artery, No. 43. Some other *soft* filaments, although like the latter, seen creeping behind the internal carotid, are inserted into and associated with the gangliform expansion of the pharyngeal branch of the eighth pair, No. 64.

78. Two *nervi molles* given off from the lowest part of the superior cervical ganglion, which, along with a branch from the *internal laryngeal*, No. 73. give origin to the *external* laryngeal nerve.—Vid. Tab. III. No. 113. 129. of this work.

79. *External laryngeal* nerve. It would be better named the *pharyngo-laryngeal* nerve, formed from the sympathetic and pneumogastric.

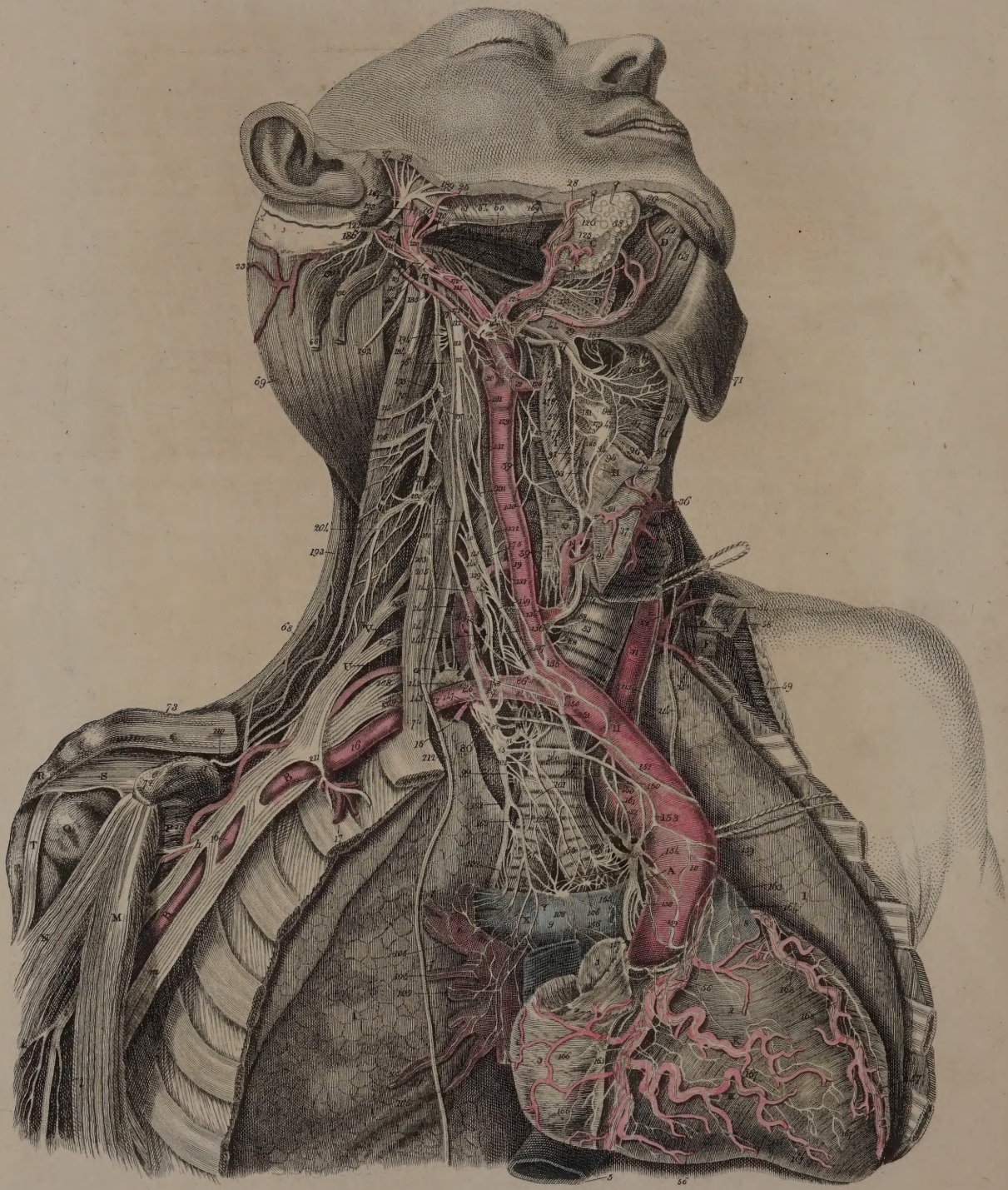
80, 80. Branches of the external laryngeal

nerve, distributed to the *middle* and *inferior* constrictors of pharynx.

81. A branch of the *external laryngeal* to the *middle* constrictor, several filaments of which go to the interior of the larynx.
82. An inconstant anastomosis between the *internal* and *external laryngeal* nerves.
83. Three twigs distributed to the *inferior* constrictor of the pharynx, to the interior of the larynx, and to the thyroid gland.
84. *Nervi molles* arising from the lower extremity of the superior cervical ganglion of the sympathetic.
85. Anastomosis of the inferior *nervi molles* with the *external laryngeal* nerve.
86. A small *nervus mollis* descending to the *superficial cardiac* nerve.
87, 87. *Soft* twigs of the sympathetic nerve going to the thyroid gland.

From the distribution of the nerves of the throat just mentioned, it may be inferred that the pharynx, a muscle destined for deglutition, nor otherwise differing from other muscles of voluntary motion, receives many nerves from different sources: For the soft palate has nerves from the fifth pair, and the rest of the pharynx receives nervous filaments from the *spinal accessory*, the *pneumogastric*, the *glosso-pharyngeal*, and the cervical part of the *sympathetic*. This circumstance is indeed not unworthy the attention of physicians in determining the seat and appreciating the symptoms of those diseases which either affect the pharynx, or, attacking some other part, draw the pharynx, on account of the disturbances excited in the whole nervous system, into sympathy, by many and often wonderful ways.

88. The great hypoglossal nerve.
89. An arched anastomosis between the first and second cervical nerves.
90. Anastomosis of the hypoglossal nerve with the first cervical nerve. Willis makes particular mention of this communication.—*Nerv. Descrip.* cap. xxix.
91. Two strong branches which the first cervical nerve sends to the superior cervical ganglion of the sympathetic.
92. Short but thick branches of the second cervical nerve inserted into the superior cervical ganglion of the sympathetic.
93. A twig from the branch of communication between the second and third cervical nerves running to the inferior apex of the superior cervical ganglion of the sympathetic nerve.
94. Anastomosis of the second with the third cervical nerve.
95. A branch from the second cervical nerve joining with the *descendens* noni.
96. Third cervical nerve.
97. A branch of the third cervical nerve running into the *descendens* noni.
98. Fourth cervical nerve.
99. Fifth cervical nerve. The commencement of the brachial plexus.
100. Phrenic nerve.
101. Portio dura of the seventh pair.
102. A branch of the portio dura going to the digastric muscle.
103. Branch of the portio dura sent to the stylo-hyoideus muscle.
e. A filament of the last branch running along with the nervi molles which are ascending on the temporal artery. Vid. Tab. III.
104. The *auricular* nerve from the third branch of the fifth pair, entering into a regular anastomosis with the portio dura of the seventh pair.
105. *Temporal* branch of the portio dura.
106. *Superior facial* branch.
107. *Middle facial* branch.
108. *Inferior facial* branch.



E. Mitchell sculp.t

PLATE III.

The Cardiac Nerves of the Right Side.

1. The lungs widely separated from each other.
2. Anterior convex aspect of the heart.
3, 3. The sinus of the right auricle of the heart, deprived of its proper membrane. The right auricle of the heart properly so called.
4. The superior vena cava, cut.
5. Inferior vena cava.
6. *Deep* pulmonary veins of the right side.
7. *Superficial* pulmonary veins.
8. Trunk of the pulmonary artery.
9. Right branch of the pulmonary artery.
10. The aorta forcibly drawn to the left side.

A. Ligamentum arteriosum.

11. Arteria innominata.
12. Right subclavian artery.
13. Right *inferior* thyroid artery.
14. Vertebral artery.
15. *Internal* mammary artery.
16. Brachial artery.
17. *External* mammary artery.
18. Supra-scapular artery.

B, B. The way in which the brachial artery is embraced by the brachial plexus. "This, or the middle plexus," says HALLER, "generally embraces the subclavian artery like a sheath."—*Elem. Physiol.* Lib. x. sect. vi. § xxxvi. Something of the same kind is seen at the passage of the femoral artery under the crural arch, and in the ham where the common tibial nerve surrounds the division of the popliteal artery.

19. Common carotid of the right side.
20. *Internal* or cerebral carotid.
21. External carotid.
22. *Superior* thyroid artery cut.
23. Occipital artery.
24. *Posterior* auricular artery.
25. Transverse artery of the face.
26. *Internal* maxillary artery.
27. *Superficial* temporal artery.
28. External maxillary artery.

C, C. Two remarkable branches of the maxillary artery going to the submaxillary gland.

29. Lingual artery.

D, D, D. *Sublingual* branches of it.

30. Sublingual gland.
31. Left carotid artery.
32. Arch of the aorta.

E. Origin of the left subclavian artery.

33. Origin of the left *inferior* thyroid artery.
34. Common origin of the *transverse* cervical and supra-scapular arteries.
35. Left *internal* mammary artery.

F. Left subclavian artery.

36. Right *superior* thyroid artery cut. *Vid.* 22.
37. Right lobe of the thyroid gland turned aside.
38. Submaxillary gland.
39. Bodies of the third, fourth, and fifth cervical vertebrae; counting from above downwards.

G. First dorsal vertebra.

40. Part of the stylo-maxillary ligament.
41. Right wall of the thyroid cartilage cut.
42. Cricoid cartilage.

H. The smooth surface of the cricoid cartilage, where it was connected with the right paries of the thyroid.

43. Thick glandular membrane of the larynx, immediately below the root of the tongue.
44. Right horn of the hyoid bone.
45. The apex of the superior and posterior process of the thyroid cartilage, cut, but still joined to the hyoid bone by the middle ligament.

46. Epiglottis.
47. Perpendicular side of the right arytenoid cartilage, along with the gland of the same name.
48. The fibres of the arytenoid muscle decussating each other.
49. Crico-arytenoideus posticus muscle.
50. Crico-arytenoideus *lateralis*.
51. The superior, middle, and inferior fasciculi of the thyro-arytenoideus muscle.—*Vid.* ALBINUS, *Tab. Musc. Hom.* Tab. xii. Fig. iv. *a*, *b*, *c*, *d*, *e*.

I, I. Those fibres of the pharynx which arise from the right side of the thyroid and cricoid cartilages, detached and thrown aside, so as to show the principal muscles of the organ of voice.

52. Infundibuliform sac of the pharynx.
53. The trachea along with the pharynx drawn to the left side with much care.
54. Right bronchus.
55. Left bronchus.
56. Right or anterior coronary artery.

K, K, Two remarkable branches of the right coronary artery distributed to the right ventricle of the heart.

57. The first branch of the left coronary artery a little removed from its natural situation and direction, which is more obliquely from behind forwards, that the nerves which are under and around it might the more easily be displayed.
58. Part of the left clavicle.
59. The fibres of the pectorales major and minor muscles, cut and retracted.

L. The upper part of the pharynx, where that portion which arises from the right horn of the hyoid bone is seen.

60. Stylo-glossus muscle.
61. Stylo-pharyngeus muscle.
62. Genio-glossus muscle.
63. Genio-hyoideus ——
64. Masseter muscle.
65. Internal pterygoid muscle.
66. Posterior belly of the digastric muscle.
67. Origin of the stylo-hyoideus muscle.
68. Part of the trapezius muscle.
69. Splenius capitis muscle.
70. Superior heads of the levator scapulae.

M. Coraco-brachialis muscle.

N. Short head of the biceps flexor cubiti.

O. The teres major and teres minor muscles.

P. Part of the subscapularis muscle.

71. Mylo-hyoideus muscle detached from the right margin of the lower jaw and reflected.

Q Head of the humerus.

72. *Coracoid* process of the scapula.

R. Acromion ——————

73. Part of the right clavicle.

S. Ligamentum commune anterius.

T. Tendon of the long head of the biceps.

74. Scalenus anticus muscle.

U, V. Scalenus medius and posticus muscles.

75. Longus colli.
76. Rectus capitis anticus major, drawn much from within, outwards.
77. The pneumo-gastric nerve drawn outwards from its natural situation, which is on the outer and back part of the common carotid artery, in order to expose the sympathetic nerve.
78. *Superficial cardiac* branch of the pneumogastric which is sent down from it while still in the neck to the fore part of the heart. Vid. HALLER, *Fascic.* II. *c.* Δ, and ANDERSCH, in the plate No. 10. which is at the end of the Treatise on the Nerves by HAASE. NEUBAUER has entirely omitted this constant and remarkable branch of the pneumogastric.
79. Another *superficial cardiac* branch of the pneumogastric, which is not constant. When present, it is, like the former, joined in the thorax to the great cardiac nerve of the sympathetic.
80. Some filaments, partly coming from the inferior cervical ganglion, and partly from the first thoracic ganglion inserted, below the subclavian and internal mammary arteries, into the trunk of the pneumogastric.

    The celebrated HAASE, (in his Treatise *De Flexibus Œsophageis Nervosis, Parisque Vagi per pectus decursu,*) has noted and described a connexion between the sympathetic and pneumogastric nerves, in the upper part of the thorax, similar to this.
81. The origin of the *recurrent* nerve, which is sometimes simple and sometimes formed by several filaments from the pneumogastric running together. VESALIUS *de Hum. Corp. Fabr.* Lib. III. Fig 2. *l. m.*; Lib. IV. Fig. 6. *b.* WILLIS esteemed it a peculiar nerve, distinct from the pneumogastric; but in man it is certainly otherwise. WILLIS wrote thus: "The recurrent nerve, although it appear to be a branch of the pneumogastric, is certainly distinct, and is a single nerve even to the origin of the pneumogastric; but for the sake of a safe course it is contained in the same sheath with the trunk of that nerve."—*Nerv. Descript.*

W. The *recurrent*, turning upwards.

82. A remarkable branch from the inferior cervical and first thoracic ganglia, running to the *recurrent*.

83. Anastomosis of the *recurrent* nerve, with a large branch of the middle cervical ganglion of the sympathetic. No. 149. Eustachius, Tab. xviii. Fig. 2. *q*. The edit. of Albinus.

84. *Ascending* branches of the *recurrent* nerve.

85. *Descending* branches of the *recurrent* nerve. In this number is reckoned the filament, No. 79. which accompanies the great cardiac nerve of the sympathetic.

86. The *recurrent* nerve ascending towards the trachea, behind the common carotid and subclavian arteries.

87. The trunk of the *recurrent* climbing over the *inferior* thyroid artery, and embracing its branches near their entrance into the thyroid gland.

"It ascends," says Haller, "near the carotid, and frequently gives off a branch which embraces the *inferior* thyroid artery. On both sides it runs on the lateral part of the bronchus before the œsophagus, then on the fore part of the bronchus behind the thyroid gland, and afterwards goes to the lowest part of the larynx under the thyroid cartilage and crico-pharyngeus muscle."—*Elem. Phys.* Lib. ix. Sect. 1. § xxviii.

88. Nervous penicilli of the *recurrent*, which, by peculiar passages, enter the interior of the trachea, and are in a delicate and wonderful manner disseminated over the lining membrane of this air-tube.

Haller remarks, "that, in ascending along the gullet, it sends several twigs of this sort to it; also several to the bronchus, which give to the internal membrane an exquisite and wonderful sensibility."—Loc cit.

89. Filaments of the recurrent distributed to the lower part of the pharynx and commencement of the œsophagus.

90. Plexuous filaments of the same nerve sent to the *inferior* constrictor of the *pharynx*.

91. Twigs of the *recurrent*, some of which penetrate the thyroid gland, whilst others enter the trachea, and, becoming very delicate, terminate in its inner membrane.

92. A remarkable branch of the *recurrent*, which establishes the principal anastomosis between this nerve and the *internal laryngeal* of the pneumogastric, No. 177.

93. Filaments of the recurrent nerve distributed to the crico-arytenoideus posticus muscle. Fabricius, ab Aquapendente, called it, "*Nervi Recurrentis portio in Musculum Aperientem.*"—*De Larynge Vocis Organo.* Cap. x. Fig 38. *a*. Casser has also delineated it, *De voce, Auditusque Org.* Tab. 13. Fig. 2, 3. The other slender filament, which is to be seen above the two latter, creeping under the crico-arytenoideus *posticus* muscle, and between it and the cricoid cartilage, has a communication with a small twig of the *internal laryngeal*, No. 180.

94. A branch of the recurrent, which first running under the insertion of the crico-arytenoideus *posticus* muscle, next divides into three or four filaments, which partly anastomose with the *descending* branch of the *internal laryngeal*, No. 180. and are partly distributed to the oblique and transverse fibres of the arytenoid muscle. In addition to this, there is another one from the two very constant and remarkable anastomoses of the *internal laryngeal* and *recurrent* nerves sent to that muscle.

95. A filament of the *recurrent*, distributed to the arytenoid gland and to the mucous membrane of the larynx.

96. Two very slender filaments of the *recurrent* nerve given to the *lateral* crico-arytenoid muscle. "The other portion of the recurrent nerve," says F. ab Aquapendente, "running more upwards, is inserted into the muscle which we have described as lying partly within and partly without the angle in the cricoid cartilage, and running in a straight direction from below upwards to the arytenoid cartilage,"—Loc. cit. Fig. 38. *b*. See Casser also, Loc. cit. Tab. 13. Fig. 4. D.

97 Several very delicate filaments reflected upwards, and distributed to the double order of fleshy fibres of which the thyro-arytenoideus muscle is composed.

"Lastly, says F. ab Aquapendente, "the third branch is distributed to the largest internal muscle closing the glottis."—Loc. cit. Fig. 38. *c*. Casser says the same thing,—loc cit. Tab. 13. Fig. 4. E. Haller, in speaking of the distribution of the *recurrent* nerve to the muscles belonging to the organ of the voice, says: "In the larynx it gives a branch to the thyro arytenoid and *lateral* crico-arytenoid muscles; another, of greater or less size, to the crico-arytenoideus posticus; lastly, it communicates with the laryngeal trunk in the crico-arytenoideus posticus muscle."—Loc. cit.

Lib. ix. Sect. 1. § xxviii. He has certainly followed the description of RUNGIUS, which is indeed consonant with truth.—*Dissert. de v ce. ejusque org.* § xxvi.

With regard to the action of the *recurrent* nerve, and how much it contributes to voice, there is the well-known experiment of GALEN which proves that, by tying or cutting the recurrent nerves, animals lose the power of vociferating. This is related to have happened to a boy in consequence of the carelessness of the physician, who cut a scrophulous tumour too deeply in the neck. But this experiment has been so often repeated both by the old and the modern anatomists, that we cannot doubt that the *recurrent* nerves are the principal instrument by which we articulate, and by which we regulate the voice. We say the *principal*, because anatomy teaches us, and experiments, several times performed by us on dogs, confirm it, that the internal laryngeal nerve of the pneumogastric has some share in expressing the voice. We knew, indeed, that by cutting the *internal laryngeal* nerve on each side in a dog, and leaving the *recurrents* whole, the voice immediately became lower, or less acute than before, as if, at the very moment in which the nerves were cut, the animal had been seized with a slight hoarseness. HIGHTON observed the same thing; "For," says he, "upon examining the effect of this experiment on the voice, it was several notes flatter, though not much altered in its strength."—*Mem. of the Medical Society of London*, p. 435, Vol. III. But anatomy shows, that in addition to branches from the double and constant anastomosis of the *internal laryngeal* with the *recurrent* nerve, the fibres of the arytenoid muscle also receive some distinct nervous filaments from the *descending* branch of the *internal laryngeal* nerve, No. 180. For this reason it is obvious that the arytenoid muscle must be somewhat weakened after the section of the *internal laryngeal* nerve; and, *vice versa*, that, by cutting the *recurrent* of each side, and leaving whole the *internal laryngeal* nerves, the arytenoid muscle will, in consequence of the distribution of the nerves of the larynx, still retain some power of volition. This is actually the case. This action of the arytenoid muscles, however, when the *recurrents* are cut, is too weak to produce voice, seeing that those muscles, viz the thyro-arytenoideus, the crico-arytenoideus *posticus*, and crico-arytenoideus *lateralis*, in which chiefly reside the power of enlarging the glottis, and stretching the vocal ligaments, have become paralytic. On this account, when the *recurrents* are tied or cut, the voice is almost necessarily extinguished; or, if any power of articulating still remain in the animal, in consequence of some action remaining in the arytenoid muscle, it can be nothing more than a weak and languid attempt. This, without referring to the parts, is confirmed by experiments on living animals, and it is clearly proved, that, for genuine voice, the integrity of the *recurrent* nerves is especially required.

98. Some other smaller inconstant anastomoses of the *recurrent* with the deeper twigs of the *internal laryngeal* nerve of the pneumogastric.
99. Trunk of the right pneumogastric nerve running behind the bronchus of the same side to the posterior part of the lung.
100. A very distinct anastomosis between the descending branches of the *recurrent* and the great cardiac branch of the sympathetic.
101. Nervous twigs, partly from the trunk of the pneumogastric, partly from the *descending* branches of the recurrent, which, after runing obliquely from right to left over the anterior surface of the trachea and bronchi, enter the *smaller anterior pulmonary* plexus of the pneumogastric —Vid. HALLER, loc. cit.—NEUBAUER, loc. cit, Tab. 1. 2, Fig. 1.
102. Penicilli of nerves from the pneumogastric running into the thorax, some twigs of which go to the œsophagus; the rest at stated intervals penetrate the right bronchus.
103. A branch of the pneumogastric entering the lung along with the pulmonary artery and bronchus.
104. A pretty thick branch of the pneumogastric always to be met with, out of which is formed a great part of the *superficial* pulmonary plexus of the right side: for it first accompanies the

X. X. Pulmonary artery and bronchus, and then runs to

Y. The superior vena cava, and from that to the right sinus venosus. Lastly, it forms

105. The superficial pulmonary plexus of the right side.
106. The *smaller anterior pulmonary* plexus of the pneumogastric. Some filaments of this plexus go to the bronchus and right lung; some, accompanied by twigs of the sympa-

thetic, run behind the pulmonary artery to the venous sinuses and auricles of the heart, and from thence to the posterior plain surface of that organ.—Tab. iv. 69. Tab. v. 43. Tab. vi. Fig. ii.

107. Some slender twigs from the cardiac ganglion of the sympathetic, No. 154, accompanied by some similar ones from the *anterior* pulmonary plexus of the pneumogastric, which enter the right lung along with the pulmonary artery.

108. Some nervous filaments of the *anterior* pulmonary plexus of the pneumogastric, along with twigs from the great cardiac nerve of the sympathetic, embracing the pulmonary artery like loops.

109. A very conspicuous anastomosis of the left *recurrent* with the *anterior* pulmonary plexus of the right pneumogastric nerve.

110. The sympathetic nerve where it has just emerged from the carotid canal.

This is the received way of speaking of it at present. According to the observations of the celebrated FONTANA, it seems very probable, that the *nervi molles* from the superior extremity of the *first cervical ganglion* of the sympathetic, follow the internal carotid artery, enter the cranium along with it, and anastomose in their course with some branches of the second branch of the fifth pair and the sixth. For the nervi molles of which we speak, having surrounded the internal carotid in several ways, and given off the Vidian nerve, go to that place where the nerve of the sixth pair crosses the internal carotid artery in the cavernous sinus, and there form a plexus to which the sixth pair is connected by two or three distinct filaments. Moreover, the nervi molles continue to ascend on the *internal* carotid as far up as the curve it makes into the interior of the cranium, when they gradually become more and more slender, and at length vanish by an uncertain termination. Hitherto we have been unable, by the most exquisite glasses, to detect or follow a single branch of these nerves accompanying the arteries ramified on the pia mater; at least, if present, they must be very slender, and as to size, they must differ very much from those which, arising from the same ganglion, accompany the external carotid, or which are seen with the naked eye upon those branches of the external carotid distributed to the temples, the face, the maxillary glands, the tongue and thyroid body. No. 115, 124, 125, 127, 128. In which way soever these nerves end at the summit of the internal carotid within the cranium, their mode of distribution teaches us that they do not arise from the fifth and sixth pairs, but that, in their ascent with the internal carotid, they only anastomose, by means of some branches, with the nerves just mentioned. This opinion becomes the more probable for the following reason, that some of the *nervi molles* of this class, remarkable for a yellow colour, climb over, in the cavernous sinus, the very white nerve of the sixth pair, in order to accompany the ophthalmic nerve of the fifth, which runs near it, on its way to the orbit. On this subject the curious will receive several more minute researches in neurology from the work of FONTANA himself, who will shortly publish a complete account of his discovery.

111. *Superior* cervical ganglion of the sympathetic nerve.

112. Two nervi molles arising from the inner side of the summit of the *superior* cervical ganglion. These pulpy and almost gelatinous twigs extend forwards behind the internal carotid, and, having divided into several others, enter into a complex anastomosis with filaments of the *glossopharyngeal*, No. 171, which descend on that vessel; they then augment the gangliform expansion of the *pharyngeal* branch of the pneumogastric, Tab. II. No. 64; lastly, they encircle the external carotid in a wonderful manner, No. 114. Vid. HAASE. *Cereb. Nerv. Anatom.* § 226. Not. *d.*

113. Two *nervi molles* coming from about the middle part of the superior cervical ganglion, which, proceeding downwards behind the internal and common carotid arteries, along with a branch of the *internal laryngeal* nerve of the pneumogastric, No. 174, compose the *external laryngeal* nerve.

It is a constant law of nature, that the sympathetic nowhere sends *nervi molles* to the *pharynx* or *larynx*, unless intimately connected and associated with the *glossopharyngeal* nerve, the *pharyngeal*, and *internal laryngeal* branches of the pneumogastric.

114. Bundles of *nervi molles*, No. 112. interspersed here and there with gangliform enlargements, embracing the trunk of the *external* carotid. In some subjects, there is here more of this net-work of the *nervi molles*

surrounding the commencement of the *external* carotid at different intervals. We have lately seen three sets of filaments, one of which embraced the origins of the temporal and occipital arteries; another those of the *external* maxillary and *pharyngeal* arteries; a third surrounded the commencement of the lingual and *superior* thyroid arteries. Now all the plexuses of this kind may be considered as so many common centres, from which the *soft* and almost *mucous* nerves arise, which, like ivy, surround and accompany the branches of the *external* carotid through the neck and face.

115. Three remarkable *nervi molles* running on the *deep* temporal artery.

The series of nerves of this kind, which follows and surrounds the branches of the *external* carotid artery, is much more widely extended than is generally supposed by anatomists. It appears that LANCISIUS was the first who mentioned them, and he has not unfitly called them the "yellowish branches of the superior cervical ganglion." *Dissert. de Gangl. Nerv.*; but he has described them so inaccurately, that it is quite apparent that he neither knew their extensive distribution nor their close connexion with the branches of the *external* carotid. To HALLER belongs the praise of giving a more complete history of these nerves, *Elem. Phys.* It is surprising, however, that the number and course of these *nervi molles* should have been unknown so long before LANCISIUS and HALLER, seeing that they are not so small as easily to escape detection, nor is much dexterity required to expose them: For, by drawing aside the external carotid, these *nervi molles* are immediately seen coursing like ivy along the branches of that artery. On account of their yellowish colour and gelatinous clearness, inquirers may have perhaps taken them for a peculiar kind of canals. But those accompanying the *deep* temporal artery are so thick, and have such an appearance, that, if their origin from the nervous networks which are at the commencement of the *external* carotid had been known, they could not have been taken for any thing else but nerves. For a sketch of these *nervi molles*, see NEUBAUER, Tab. II. Fig. I. 135, 136. He called them *gangliform branches*. In speaking of this apparatus of *nervi molles*, the celebrated MECKEL says, "Of all the vessels of the body, the arteries of the face are those which are provided with the greatest number of the nerves just mentioned, as coming from the soft branch of the sympathetic nerve."—*Mem. de Berlin. ann.* 1752.

116. A small ganglion found in almost all human subjects, into which one or more of the *nervi molles* accompanying the deep temporal artery swell. ANDERSCH, (*Fragment Neurol.* § lvii.) mentions this ganglion. It has the clear appearance of the vitreous humour. NEUBAUER has delineated it, loc. cit. Tab. II. Fig. 1. 148.

117. A soft nerve, ascending on the posterior surface of the *deep* temporal artery, and running into the ganglion, No. 116, along with the accompanying nerves which run along that artery.

118. A filament of the *nervi molles* of the deep temporal artery turning round it.

119. A nervous filament from the portio dura of the seventh pair, or from the branch communicating with the ganglion, No. 116, or, *vice versa*, if thought more proper. MECKEL has delineated this small nerve in his splendid plate of the nerves of the face, No. 126. *Acad. de Berlin, ann.* 1752. "The anterior of these small branches, which is called the stylo-hyoidean nerve, descending behind the auricular artery, is divided anterior to the stylo-hyoideus muscle, into several, commonly three small branches, the principal of which descending forwards and inwards, between the auricular artery and the trunk of the temporal, first gives off a twig which descends on the fore part of the stylo-hyoid muscle, and which, accompanying the temporal artery, anastomoses on its posterior surface with a branch of the sympathetic ascending on the fore part of the convex surface of the temporal artery." NEUBAUER has also pointed out this branch of the portio dura, loc. cit. Tab. II. Fig. 1. 72. 150.

120. *Nervi molles* arising from the ganglion No. 116, and going up along with the temporal artery to the face and jaws.

121. A slender nervous filament, supported by the posterior auricular artery, which forms a new anastomosis of the temporal *nervi molles* with the portio dura. MECKEL, loc. cit. says, "The portio dura sometimes gives a twig which is inserted into the small branch of the sympathetic accompanying the auricular artery."

122. Two filaments of the *nervi molles* of the

deep temporal artery accompanying the *internal* maxillary. MECKEL, *Tab. Nerv. Faciei.* NEUBAUER, loc. cit. Tab. II. Fig. 1. p. 150, *d.*

123. The third distinct anastomosis of the temporal *nervi molles* with the portio dura of the seventh pair.

124. *Nervi molles* of the superior cervical ganglion, accompanying the external maxillary artery.

HALLER says, "the nervi molles go to the carotid artery, and run along all its external branches, viz. the labial, temporal, lingual, and pharyngeal, but their termination is very obscure." *Elem. Phys.* Lib. x. Sect. vi. § xli. ANDERSCH has described each very minutely. *Fragment. Neurol,* § lv.

125. Soft filaments of the superior cervical ganglion penetrating the submaxillary gland. "It follows the labial artery," says HALLER, "and I have traced it as far as the submaxillary gland, where I think that it communicates with the third branch of the fifth pair."—loc. cit. ANDERSCH was of the same opinion,—loc. cit. § lv.

126. The distribution of the *nervi molles* accompanying the *external* maxillary artery to the face, where it appears to us they anastomose with the inferior facial branch of the portio dura. On this subject MECKEL remarks, "The arteries of the face have also their particular nerves. Indeed, each of them is accompanied by a small branch of the sympathetic, which arises from the superior cervical ganglion behind the division of the carotid artery, accompanies the external maxillary, and furnishes a twig to each of its branches. Of these branches of the sympathetic, that which ascends on the temporal artery is seen in the Figure (No. 308,) but the others, which had become dry, could not be represented by the painter. These nerves terminate in the coats of the arteries, and go from the external maxillary artery to join themselves by anastomosis to the portio dura, either near the maxillary artery or on the margin of the inferior jaw."—*Mem. de Berlin*, an. 1752.

127. *Nervi molles* surrounding and accompanying the lingual artery.

128. Soft filaments of the superior cervical ganglion of the sympathetic nerve running round and over the *superior* thyroid artery: they may be easily followed to some extent into the substance of the thyroid body along with the artery of the same name.

What the *nervi molles*, which we have already described as embracing and accompanying extensively the branches of arteries, are to the branches of the external carotid in the neck and face, so are the larger branches of the sympathetic nerve under the clavicles, in the thorax and abdomen, to the trunk of the aorta and its branches, distributed to the viscera, which the very slender twigs of the sympathetic nerve surround and follow in a wonderful and complex manner. Nor must it be supposed, that so great a number of *nervi molles* as embrace the thoracic and abdominal aorta, was created for this great vessel alone; since it is quite evident from anatomy, that these nerves are only applied to the trunk of the aorta and its branches, and that a very small part of them is spent in the muscular coat of the arteries. In this close connexion of nerves with arteries, and that wonderful and widely spread apparatus of nervous plexus surrounding them, nothing but these vessels could supply so fit a support to the nerves going to the viscera and other parts. It has always appeared to us, that the great and noble designs of nature are no where more apparent than in this mechanism. For, in our consideration, the life of animals, once excited by the application of mechanical or other stimulants to the nervous system, is constantly supported and nourished by the circulation of the humours, the action of the muscles, the vital principle of the air, the exercise of the mind, and the like; but, by irritations of this kind, they support and nourish the energy of the nerves, together with the life of individual parts; by this I mean the proper regulation of the functions and the life of the animal. We admire the great wisdom by which the nervous system is excited, as extensively as the impulses of external agents can be received, by the organs of the senses and the voluntary muscles, not only on the surface of the body, but also internally by the circulation of the humours and the beating of the arteries. It is in consequence of this that we see, in the neck, the thorax, and abdomen, so many convolutions of nerves and their plexuses surrounding in the most convenient way the arteries like ivy, and also their close connexions with the very slender twigs of the sympathetic in the deepest recesses of the viscera, by which, when external agents are not present, the more internal part of the nervous system, where it is distributed through the neck, thorax, and abdomen,

is extensively excited by the oscillations of the arteries, and thence is constantly keeping up the tone and vitality of the organs as well as their fitness for action Hence, we think, it is with such happy success that physicians apply stimulants, sometimes externally, sometimes internally in the loss of tone of parts, and when the circulation of the blood and the strength generally are depressed, as in nervous fevers, the remedies being, as they are called, very diffusible; because, by their action, an increased energy of the nerves, either externally or internally, follows,—so that the tone of all the parts to which the nerves are distributed, the faculty of action and re-action, and even the life of the animal, are restored.

129. *Nervi molles* coming from the inner side of the middle part of the superior cervical ganglion, No 113, which, along with a branch of the *internal laryngeal* nerve of the pneumogastric, No. 174. form the *external laryngeal.*

130. Two filaments of the *external laryngeal* nerve running behind the common carotid to the *superficial* cardiac nerve, No. 132.

131. Other nervi molles from the middle and lower part of the superior cervical ganglion of the sympathetic, which form so many roots of the *superficial* cardiac nerve.

132. *Superficial* cardiac nerve, called by HALLER, "supremus, et superficialis cordis" VIEUSSENS was the first who delineated this nerve on the left side, although in a rude and slight way.—*Neurograph. Univ. Tab. Nerv. Octavi et. Intercostal,* Δ.—ANDERSCH (*Tab. Nerv. Card. m.* 7, 8.) has sketched it more accurately on the left side of the neck. NEUBAUER has done so very carefully on the right side.—Loc. cit. Tab. 1, 13, 14, 18.

In consequence of the larynx and pharynx being in our plate drawn so much to the left, and removed from the cervical vertebræ, the *superior* cardiac nerve does not appear to descend so near the pharynx and trachea as is the case in the natural situation of the parts.

133. A branch of the *superficial* cardiac nerve dividing into three smaller ones; of which,

134. One entering the thyroid body accompanies the artery of that name.

135. The other two go to anastomose with the *first* cardiac nerve of the pneumogastric, No. 78.

136. The termination of the *superficial* cardiac nerve by a double anastomosis, as it was seen in this subject, one of them with the remarkable branch, No. 149. of the *middle* cervical ganglion of the sympathetic. This is also seen in NEUBAUER, loc. cit. Tab. 1, 19, 20. The other,

137. With the right *recurrent* nerve of the pneumogastric.

HALLER had meant an anastomosis similar to this, when he says, "now different branches go from the middle cervical ganglion to the heart; and, first, some one or other, goes to the superficial cardiac nerve, which there communicates with the recurrent nerve."—*Loc. cit.*

The *superficial* cardiac nerve does not however always terminate so quickly, but often descends deeper into the thorax than has yet been shewn, and sometimes runs over the arteria innominata, and surrounds the aorta in various ways; sometimes it communicates below the subclavian artery with the recurrent, and also with the great *cardiac* nerve of the sympathetic. Lastly, it sometimes, as we shall shew in the left side, after forming an anastomosis with the great cardiac plexus of the sympathetic, runs on the pulmonary artery to the heart,

138. The trunk of the sympathetic nerve below the *superior* cervical ganglion. In those subjects in which the *middle* cervical ganglion is large, and has a great part placed above the thyroid artery, as in our plate, that part of the trunk of the sympathetic nerve placed between the two cervical ganglia seldom receives in its course any filaments from the cervical nerves.

139. *Middle* cervical ganglion of the sympathetic nerve. In consequence of this ganglion being generally placed near the *inferior* thyroid artery, HALLER has called it the *thyroid ganglion.* NEUBAUER chose rather to call it the *inferior cervical ganglion.* There exist many varieties in this ganglion with regard to size and shape, which NEUBAUER has with much care collected and delineated in his Work, "De Nervo Intercostali," so frequently referred to.

140. Three branches coming from the third, fourth, and fifth cervical nerves, to be united to the middle cervical ganglion of the sympathetic. Each of these branches runs to the ganglion just mentioned behind the rectus capitis *anticus major*, and the origin of the scalenus. HALLER has remarked, that the superior of these branches is sometimes greater than the trunk of the sympa-

thetic itself; this also appears in our Plate. NEUBAUER (loc. cit. Tab. iii. Fig. iv. 7,8.) has also described and delineated a branch which runs from the phrenic nerve to the middle cervical ganglion. This I think very rarely happens.

141. *Deep* branch of the *middle* cervical ganglion. It is soft, and its thick trunk, after proceeding from the lower part of the *middle* cervical ganglion, divides unequally, and embraces the origin of the vertebral artery like a loop. It may be esteemed as the trunk of the sympathetic nerve, continued from the *middle* to the *inferior* cervical ganglion.—Vid. NEUBAUER, Tab. iii. Fig. 1. 99. 100.

Z. *Smaller* portion of the *deep* branch of the *middle* cervical ganglion, running behind the vertebral artery.

a. The insertion of the *deep* branch of the *middle* cervical ganglion into the *inferior*.

b. The *larger* portion of the *deep* branch of the *middle* cervical ganglion running from within, outwards, to embrace the origin of the vertebral artery, and to join

c. The inferior cervical ganglion, where, along with the *smaller* portion, Z. *a*. it forms a network around the vertebral artery.

142. *Inferior* cervical ganglion, the first thoracic of NEUBAUER, which he has accurately described in these words: "It is placed at the upper part of the thorax, so that it lies on the head of the first rib, its anterior part being on the outer margin of the longus colli muscle, and its posterior on the concave surface of that rib; it is always covered by the vertebral artery, or the subclavian, or, as more frequently happens, in part by both."—Loc. cit. § xxxiii. Tab. ii. Fig. iii. 70. Tab. iii. Fig. i. 98.

143. The commencement of the *thoracic* ganglion.

144. Nervous filaments given off from the three inferior cervical spinal nerves, and running to the inferior cervical ganglion below the scalenus *anticus* muscle. Vid. NEUBAUER, loc. cit. Tab. ii. Fig. iii. 71, 72, 73.

145. A nervous twig of the *middle* cervical ganglion, which has scarcely passed the subclavian artery before it gives off several filaments; of which

146. One surrounds the origin of the *inferior* thyroid artery, and afterwards joins the *inferior* cervical ganglion;

147. Another partly embraces the subclavian artery, and goes behind that vessel to the *inferior* cervical ganglion, and the upper part of the *first thoracic*; after giving off two or three filaments, it partly encircles the *internal* mammary artery, and accompanies it to some extent.

148. The third of these nervous filaments, larger than the two preceding, which surrounds the subclavian artery, and runs under it to the *inferior* cervical ganglion, and even sometimes to the *first thoracic*.

149. A remarkable cord from the lower part of the *middle* cervical ganglion, which, after entering into an anastomosis with the *superficial* cardiac nerve, descends behind the subclavian artery, and associates itself with the *recurrent* nerve of the pneumogastric, No. 83

150. The *great deep* cardiac nerve of the sympathetic.

In the subject from which this plate was drawn, the origin of the *deep* cardiac nerve, from the *middle* cervical ganglion, was very like that which NEUBAUER has delineated, Tab. ii. Fig. iii. 15. We may in a general way affirm, whether there be more or fewer nerves which come off from the inner side and inferior extremity of the *middle* cervical ganglion of the right side, that they are all nevertheless distributed by a threefold course, viz. some partly compose the *great deep* cardiac nerve; others unite along with the *recurrent* and *superficial* cardiac nerves; the rest, after surrounding the subclavian, the *internal* mammary, the *inferior* thyroid, and vertebral arteries, throw themselves into the *inferior* cervical ganglion and *first thoracic*.

151. *Descending* branch of the recurrent going to the *deep* cardiac nerve.

152. Another *smaller* cardiac nerve.

This arises from the *inferior* cervical ganglion, proceeds obliquely downwards from right to left behind the subclavian artery, and after having passed over the arteria innominata, arrives at the arch of the aorta near the heart. It might be very properly called "Cardiacus aortæ superficialis."

153. The great deep cardiac nerve, running deep under the arch of the aorta to the heart.

154. The *soft* and *pellucid ganglion* of the deep cardiac nerve. To the great diligence and dexterity in anatomical matters of the celebrated WRISBERG, we owe the discovery of this ganglion. Vid. *Comment. de Nervis*

arterias, venasque comitantibus. He describes it thus: "The trunk of the cardiac nerve being now completed by the union of all its roots, dives deeper into the thorax, and there gains the posterior surface of the aorta. From the insertion of the last root into the great cardiac nerve, to its new division into smaller branches, the trunk of the cardiac nerve runs smooth and even to the extent of about two inches. Now, from that place where it receives the last branch from the recurrent, the new ganglion begins to be formed; it imperceptibly increases, until at its broadest place it has attained the breadth of a line, and at its thickest the thickness of half a line. He is pleased to call this ganglion the *cardiac*.

155. A branch of the *cardiac* ganglion running behind the pulmonary artery to the posterior region of the heart, and the origin of the left coronary artery.

Some slender filaments from this branch mingle with the *anterior* pulmonary plexus of the pneumogastric, No. 106.

156. A slender filament from the cardiac ganglion, which, along with filaments of the *anterior* pulmonary plexus of the pneumogastric, No. 108, forms a net-work surrounding the pulmonary artery, behind which, nervous filaments go to the superior vena cava, the sinuses of the auricles, and the plain surface of the heart.

157. Gelatinous and pellucid twigs from the cardiac ganglion running to the origin of the *left* coronary artery.

158. Two branches of the cardiac ganglion, turning under the aorta, and running over its anterior surface, between it and the trunk of the pulmonary artery, to the *right* coronary artery.—Vid. Tab. iv. No. 32.-33. of this work.

159. Small filaments of the *deep* cardiac nerve and cardiac ganglion, embracing the trunk of the aorta, and enlarging the plexus of the *right* coronary artery, No. 163.

160. The *smaller deep* cardiac nerves of the left side, which come from the *inferior* cervical and *first thoracic* ganglion, and run behind the arch of the aorta along with the *great deep* cardiac nerve of the right side.

161. Superficial cardiac nerve of the left side. Vid. Tab iv. No. 41. of this work.

162. That remarkable anastomosis which is formed by the trunks of the cardiac nerves of each side, under the arch of the aorta, a little above the heart. This was called by Haller the "*Great cardiac plexus.*" Boerhaave had this in view when he spoke of the trunks of the cardiac nerves being compressed during the diastole of the large arteries. In consequence of this compression he supposed that the relaxation or diastole of the heart took place.

163. Right coronary plexus, formed of a net-work of nervous filaments from the branches of the cardiac nerves of both sides, and lying at the commencement of the coronary artery, between the aorta and the origin of the pulmonary artery.—Vid. Tab. iv. No. 37. of this work.

Haller not only knew that the filaments of the *right coronary* plexus followed the branches of the coronary artery over half the anterior surface of the heart, but that the nervous filaments coming from the left cardiac joined this plexus.—*Elem. Phys.* Lib. iv. Sect. iii. § xxv.

164. Nervous filaments from the cardiac nerves of the left side, going to the *right coronary* plexus and anterior surface of the heart.

165. The course of the nervous filaments of the *right coronary* plexus, which accompany the trunk of the *right coronary* artery to the root of the sinus of the right auricle.

166. Some very slender filaments of the *right coronary* plexus, following the small arteries of the right sinus venosus.

167. Small nerves of the *right coronary* plexus, accompanying the branches of the *right* coronary artery which ramify on the anterior surface of the heart.

168. That series of filaments of the *left coronary* plexus, which surrounds and accompanies the anterior branch of the left coronary artery.—Vid. Tab. iv. No. 55, 56, 57, of this work. By a constant law of nature this series of the nerves of the heart, following the *first* branch of the *left* coronary artery, is more remarkable than any other in the whole heart, and has larger branches and filaments. But generally all the nerves hitherto described on the surface of the heart nowhere penetrate it but at or near those places where the arteries begin to vanish in the muscular substance of this organ. For, if small nerves seem sometimes to enter the heart alone, as some do in this plate, particularly towards the apex of the heart, they, if diligently followed under the first layer of muscular fibres, will be found after a short course to join the nearest arteries buried in the flesh.

169. *Glossopharyngeal* nerve.
170. *Pharyngeal* nerve of the pneumogastric.
d. Flaments of the glossopharyngeal sent over the internal carotid.
171. A plexuous anastomosis of filaments of the *glossopharyngeal* and *pharyngeal* nerves with the superior *nervi molles* of the superior cervical ganglion of the sympathetic. At the place where the nerves of this threefold order run together, the *internal* carotid artery is surrounded by those nerves by which it is covered; nor is it uncommon for the superior nervi molles, a little before they form the anastomosis just mentioned, to swell into a ganglion, concerning which HALLER has spoken in his *Dissert. de Vera Intercostal. Orig.* § xvii.
172. *Pharyngeal* nerve of the pneumogastric running downwards and forwards to the *pharynx*.
e. Anastomosis of the *glossopharyngeal* with the *pharyngeal*.
173. Distribution of the *glossopharyngeal* near the tonsil and root of the tongue.
f. The *internal laryngeal* from the pneumogastric, running obliquely downwards to the *larynx* behind the internal carotid.
174. A branch of the *internal laryngeal* which, joining with some *nervi molles* of the superior cervical ganglion, No. 129, forms the *external laryngeal nerve*.——Vid. NEUBAUER, Tab. i. 257, 258, 259, 260.
175. Twigs of the *external laryngeal* nerve sent to the constrictors of the *pharynx* and the interior of the *larynx*.
176 Filaments of the *external laryngeal* to the inferior constrictor of the *pharynx*, the *larynx*, and the thyroid body.

The nerves just mentioned were comprehended by HALLER under the name of the "*Laryngeal plexus of the Nervi molles*." That illustrious man called those *nervi molles* of the superior cervical ganglion which are joined with the *glossopharyngeal* and *pharyngeal* nerves, No. 171. the "pharyngeal plexus;" whilst to those soft twigs of the same ganglion which are connected with the *internal laryngeal* nerve of the pneumogastric, No. 174. he gave the name of "laryngeal plexus."

177. *Internal laryngeal*, where it enters the deep parts of the *larynx* between the os hyoides and superior horn of the thyroid cartilage.
178. A *descending* branch from the *internal laryngeal*, just at its entrance into the organ of voice, which forms a very remarkable anastomosis with the *internal laryngeal* and *recurrent* nerves. It is quite evident from the following passage in Lib. XVI. *de Usu Partium*, cap. 4. that GALEN was not ignorant of this anastomosis. "There takes place in the larynx a particular union of the recurrent nerves with those which I have pointed out as running from the sixth conjunction to the inside of the larynx: For branches of these recurrent nerves unite with the latter in all animals which I have examined: but it is particularly evident in bears, dogs, oxen, and other animals of this kind, nature giving strength to these nerves from their mutual connexion.

EUSTACHIUS (Tab. XVIII. Fig. 11. *n. o.—edit.* Albin.) delineated it. MONRO also on the Structure and Functions of the Nervous System, Tab. XXVI. The other things which MONRO, in this plate, exhibits concerning the distribution of the *internal laryngeal* and *recurrent* nerves, do not agree with our plate, nor, as far as we know, with truth. We have seen those descriptions said to have been taken from Nature, which RUNGIUS (*Dissert. de Voce ejusque Organ* § xxvi.) and HALLER, (*Elem. Phys.* Lib. ix. Sect. 1. § xxvii.) have published concerning the distribution of the *internal laryngeal* nerve in the interior of the *larynx*.

179. A set of filaments from the *internal laryngeal* nerve sent to the arytenoid gland.
180. Some filaments of the *internal laryngeal*, partly joined with twigs of the *recurrent*, No. 93-94., and partly inserted into the oblique and transverse arytenoid muscles.
181. Twigs of the *internal laryngeal* distributed to the arytenoid gland and mucous membrane of the *larynx*.
182. Filaments of the *internal laryngeal* nerve going to the glandular substance of the epiglottis, some of which surround that body; others piercing the cartilage by peculiar openings, go to the glandular mass placed on the opposite surface of it.
183. Another series of twigs from the *internal laryngeal* nerve going to the thick and glandular membrane which is on and near the upper part of the *larynx*.

These ramifications of the *internal laryngeal* nerve being known, it is immediately apparent that this nerve for the most part is destined to produce that exquisite feeling for which the *larynx* is so remarkable,

whilst the office of the recurrent is, as we have more fully shown at No. 97. to draw and stretch the principal muscles of the glottis and vocal cords.

184. The trunk of the hypoglossal nerve cut and turned aside.

185. Anastomosis of the hypoglossal with the arch of communication between the first and second cervical nerves.

186. The portio dura of the seventh pair or *communicans faciei.*

187. Auricular nerve of the third branch of the fifth pair joined with the portio dura.

188. *Temporal branches* of the portio dura.

189. *Middle and inferior facial branches* of the same nerve.

g. A *subcutaneous cervical branch* of the portio dura, cut.

190. The *digastric branch* of the portio dura, from which there arose, in this subject,

191. The *stylo-hyoidean* nerve, of which the branch, No. 119. joins the small ganglion of the temporal *nervi molles.*

192. The *greater external* branch of the *spinal accessory* nerve, cut.

193. The continuation of the spinal accessory.

194. The spinal roots of the superior cervical ganglion of the sympathetic, coming from the union of the first and second cervical nerves.

195. A soft, pellucid, and gangliform root from the second cervical nerve, inserted into the inferior extremity of the superior cervical ganglion.—Vid. NEUBAUER, Tab. III. Fig. 1. *b.*

196. The largest branch of the third anastomosis of the cervical nerves, which gives off the *posterior auricular.*

197. A twig to the rectus capitis anticus major muscle.

198. Third cervical nerve.

199. A branch uniting the third and fourth cervical nerves.

200. The superior origin of the phrenic nerve.

201 Fourth cervical nerve.

202. Another origin of the phrenic.

203. The third and inferior origin of the phrenic nerve.

204. *Deep* branches of the fourth conjunction of the cervical nerves. The most external of these are covered by the fibres of the trapezius muscle, and form an anastomosis with the *spinal accessory*; the more internal give branches to the posterior scaleni, to the subclavius, and pectoral muscles, and lymphatic glands of the neck, and are lastly distributed to the integuments around the neck and upper part of the thorax.

205, 206, 207, 208. The four inferior cervical nerves.

209. The first dorsal nerve.

210. Supra-scapular nerve.

h. A branch of the *perforans* of Casser given to the coraco-brachialis muscle.

i. The *perforans* of Casser.

k. l. Branches which the perforans Casserii gives to the biceps, and brachialis internus muscle.

211. Twigs of the *brachial plexus*, which are distributed to the pectoralis major, the pectoralis minor, and serratus anticus muscles.

m. Median and radial nerves.

212. The trunk of the phrenic nerve within the thorax.

213. The pneumogastric nerve of the left side covered in great part by the left carotid.

214. Left phrenic nerve.

n. The inferior root of the left phrenic nerve from the fifth cervical.

o. Part of the *left brachial* plexus.

215. Occipital branches of the second cervical nerve.

E. Mitchell sculpt

PLATE IV.

Cardiac Nerves of the Left Side.

A—The convex margin of the heart, much drawn from the left to the right side, and rolled back.

Vesalius has a Plate in which there is the same disposition of the heart and lungs as in ours. *De ff. O. Tabr. Lib.* vi. *Fig.* vi.

B—Part of the plane surface of the heart.

C—The left or posterior auricle of the heart, raised and purposely suspended, that the first principal and *posterior* branch of the *posterior* coronary artery, and the nerves accompanying it, which the auricle covers through great part of its course, may be seen.

D—Sinus of the pulmonary veins.

E—Trunk of the pulmonary artery, purposely reflected upon itself, and folded back, that the remarkable cardiac nerves of the left side, which, adhering to this artery, run along its posterior surface, might be more advantageously exposed.

F—Commencement of the right branch of the pulmonary artery.

G—Left branch of the pulmonary artery.

H—Ligamentum arteriosum.

I, I—Arch of the aorta.

K—Arteria *innominata*, or common trunk of the right subclavian and right carotid.

L—Left carotid artery.

M—Left subclavian artery.

N—Thoracic aorta.

O, O, O—Inferior thyroid artery.

P, P—Superior thyroid artery.

Q—Vertebral artery.

R—External cervical artery, a branch of the inferior thyroid artery.

S—Transverse artery of the neck.

T—Internal mammary artery.

U, U—Right brachial artery.

V, V—Deep scapular artery.

X—Œsophagus.

Y—Right Lung.

Z—Left lung.

a—Trunk of the posterior coronary artery, which, directly emerging from the aorta, and covered through part of its course by the trunk of the pulmonary artery, is immediately reflected to the left or posterior surface of the heart.

b,—The first principal and anterior branch of the posterior coronary artery, which,

c, *c*—When it has proceeded for a short distance upon the convex margin of the heart,

d—Is carried forward, and running upon the anterior region of the heart, follows almost the direction of the septum of the ventricles.

The other principal and posterior branch of the great or posterior coronary artery, which, after passing over the convex margin of the heart, runs backward between the auricle and the sinus of the pulmonary veins, to gain the plain surface of the heart, runs backwards between the auricle and the sinus of the pulmonary veins.

b—Small arteries running to the posterior auricle of the heart.

g—One of the principal arteries of the sinus of the pulmonary veins.

h, *h*, *h*, *h*—Branches of the posterior branch of the left coronary artery running behind the convex margin of the heart to the plain surface of this viscus.

i, *i*. *i*.—Branches of the left coronary artery shortly after their origin, proceeding to the base of the heart.

k, *k*—Principal trunks of the pulmonary veins of the left side.

l, *l*—Deep pulmonary veins.

m, *m*, *m*, *m*—Superficial pulmonary veins.

n—Left horn or lobe of the thyroid gland.

o—Trachea.

p—Part of the pharynx.

q—Part of the left sterno-thyroid muscle.

r—Portion of the left sterno-hyoid muscle.

s—Left coraco-hyoid muscle cut.

t—Commencement of the rectus capitis anticus major muscle.

u—Scalenus anticus muscle of the left side.

v—Portion of the scalenus posticus.

w—Left clavicle.

x, *x*—Vertebrae of the neck.

y—Longus colli muscle.

z, *z*—Bronchia.

No.

1. Left intercostal nerve.
2, 3. Branches of the third pair of cervical nerves proceeding to the intercostal.
4. Trunk of the intercostal nerve, where it passes over the inferior thyroid artery.
5. Middle cervical ganglion of the intercostal nerve; or, as some call it, thyroid ganglion.

   The figure and size of this ganglion varies remarkably in different subjects, and is even sometimes different in the opposite side of the same body.
6. Fourth cervical nerve.
7. Nerves sent from the fourth cervical nerve to the middle cervical ganglion.
8. Deep-seated twigs from the fourth and fifth cervical nerves, running behind the inferior thyroid artery, to the middle cervical ganglion.
9, 10. Two strong branches proceeding from the internal-lateral and inferior region of the middle cervical ganglion, which, hooking round the vertebral artery, proceed to the middle cervical ganglion.
11. Inferior cervical ganglion.
12. Thickish branches of nerves running to the inferior cervical ganglion, from the fourth, fifth, and sixth cervical nerves.
13 A nervous filament, inserted into the inferior cervical ganglion, from the last cervical and first dorsal nerves.
14. Small nervous fibrillae of the superior cervical ganglion of the great intercostal, which form the commencement of the left superficial cardiac nerve.
15, 16, 17. Origins of the left superficial cardiac nerve, and other additions derived from the trunk of the intercostal nerve below the superior cervical ganglion.
18 Trunk of the left superficial cardiac nerve. We agree with Haller that this nerve is very rarely wanting on the left side.
19. Anastomosis between the origins of the superficial cardiac nerve, derived from the superior cervical ganglion, and those proceeding from the trunk of the sympathetic, to enlarge this superficial cardiac nerve.
20. Anastomosis observed to exist in this subject between the superficial cardiac and trunk of the eighth pair.

   We have very seldom indeed, observed this communication.
21. Filament of the superficial cardiac nerve, which, crossing above the arch of the aorta, is partly joined to the cardiac branch of the eighth pair, and partly to the other deep cardiac nerve of the sympathetic.

No.

22. Superficial cardiac nerve, gliding high up behind the aorta to the great deep cardiac plexus.
23. Soft pulpy nervous twigs, proceeding from the middle cervical ganglion, some of which supported by the trunk of the inferior thyroid artery, and others by the vertebral artery, run towards the left subclavian artery.
24. A remarkable hoop or circle, formed by the nerves of the middle cervical ganglion, proceeding to the inferior cervical and first thoracic ganglion, by which the subclavian artery is surrounded.
25. Another noose upon the subclavian artery, formed by a conspicuous nerve of the inferior cervical ganglion, uniting with the other left cardiac nerve of the great intercostal.
26. Another smaller deep cardiac nerve of the sympathetic of the left side, originating by many branches from the inferior and middle cervical ganglia.

   I may remark, that this nerve sometimes proceeds behind the aorta to the great deep cardiac plexus, sometimes distinctly as a single twig, at other times double, and occasionally in a triple form.
27. Another smaller deep cardiac branch, sent off from the middle cervical ganglion.
28. Gangliform swelling of the small deep cardiac nerve.
29. Situation where the small deep cardiac nerve collects its own filaments and those of the accompanying nerves upon the posterior surface of the aorta, transmitting them to the great deep cardiac plexus; to which
30. A small filament is added from the inferior cervical ganglion, which, covered through great part of its course by the subclavian artery, ascends directly over the arch of the aorta.
31. Great deep cardiac plexus. This plexus is formed by the anastomosis between the cardiac nerves of both sides, in a manner similar to that by which the splanchnic nerves, immediately under the diaphragm, unite to form the superior mesenteric plexus.

   Haller speaks in the following manner of the formation of the great deep cardiac plexus: "Certainly some nerves, principally cardiac, originating from the superior, middle, and inferior cervical ganglion, and running behind the aorta, compose the great cardiac plexus situated on the anterior surface of the left branch of the trachea, behind the aorta, and above the pulmonary artery, to

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the right of the ductus arteriosus. Branches from the right side contribute to the formation of this plexus. From this plexus the nerves of the heart always proceed in three directions to their different terminations."—*Elem. Physiol.* Lib. VI. Sect. III. § XXV.

32. Cardiac ganglion of WRISBERG.

33. A reticulated bundle of nerves formed by filaments from the great deep cardiac plexus, which, running between the aorta and the pulmonary artery, and receiving distinct branches from the cardiac ganglion of WRISBERG, proceeds to the anterior coronary artery and the anterior surface of the heart.

34. Anastomosis between the small cardiac nerve of the right side, or superficial cardiac nerve of the aorta, and the net-work of the great deep cardiac plexus.

35, 36. Filaments of the deep cardiac nerve of the right side, proceeding to the nervous net-work of the great deep cardiac plexus situated between the aorta and the pulmonary artery.

37. Principal origin of the anterior coronary plexus.

38. A thickish nerve arising from the left side of the great deep cardiac plexus, and immediately forming upon its origin an oval-shaped ganglion, from which many twigs lying upon the ligamentum arteriosum proceed. These branches partly run to those which form the anterior coronary plexus, partly to those which form the posterior coronary plexus.

39. Nervous twigs, No. 38. proceeding to the anterior coronary plexus.

40. Fasciculus of nerves arising from the left side of the great deep cardiac plexus, and winding behind the ligamentum arteriosum H, and running upon the left branch of the pulmonary artery, constituting the principal seats of the great deep cardiac nerve of the left side.

41. Deep insertion of the superficial left cardiac nerve into the deep cardiac nerve of the left side, behind the ligamentum arteriosum H.

42. Intricate and complicate origin of the great deep cardiac nerve of the left side, No. 40, 41. already indicated.

FALLOPIUS appears to have accurately understood the origin of this nerve when he wrote, "Under the base of the heart, where the arterial vein (pulmonary artery) begins to be reflected to the left side, and where we observe that remarkable arterial passage in the fœtus which joins this vein with the

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aorta, there is a plexus or nervous anastomosis, similar to that which I have already described as existing in the mesentery, but smaller, stronger, and more solid, from which an abundant supply of nervous material is diffused over the whole base of the heart. Many branches of small nerves arising from this plexus are dispersed over the heart, and through its substance, although I could not minutely trace them. Anatomists judging hastily have neglected this ligament, and have thereby overlooked many nerves which are distributed to the heart".—*Observ. Anat.* page 208.

43. The trunk of the great deep cardiac nerve of the left side. This nerve is soft, pellucid, and gangliform, constantly preserving the same appearance throughout all its ramifications. This seems to be that single nerve which GALEN assigned to the heart, and which VESALIUS depicted, although he derived it from the eighth pair, and from a common root with the recurrent, an oversight hardly to be imagined.

44. Additional filaments, which the great deep cardiac nerve of the left side receives from the cardiac plexus, through the intermediate ganglion, No. 38.

45, 46, 47, 48. Division of the great deep cardiac nerve into branches near the posterior surface of tne pulmonary artery, which, uniting with the gelatinous branches of the cardiac ganglion, complete the posterior coronary plexus.

49, 50. Some small twigs of the great deep cardiac nerve of the left side creeping along the anterior surface of the pulmonary artery, and running into the anterior coronary plexus.

51, 52. Branches of the great deep cardiac nerve of the left side, which, after many windings, proceed behind the pulmonary artery to the posterior coronary plexus.

53. Some very minute twigs of the great deep cardiac nerve of the left side, running to the left lung along with the artery of the same name.

54. Posterior coronary plexus, or anastomosis between the soft pellucid branches of the deep cardiac of both sides, which ceasing at the commencement of the posterior coronary artery, and immediately dividing again and again, follows the course of the posterior coronary artery, by which means it is extensively distributed upon the anterior and posterior surface of the heart.

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"But most of the branches," HALLER says, "proceed to the left coronary artery, and "accompanying the anterior branch of this "artery, run to the superior surface of the "heart; others in great numbers direct their "course along with the posterior branch to "the hollow surface of the heart, and to the "left auricle, the rest of which they encircle." *Elem. Phys.* Lib. VI. Sect VI. § XXV.

55. Branches of the posterior coronary plexus, accompanying the anterior branch of the posterior coronary artery.

56. Twigs of the posterior coronary plexus, which, proceeding for a long way under the pulmonary artery towards the base of the heart, and crossing over the trunk of the posterior coronary artery, are joined to the anterior branch, *b*, of this artery.

57. Origin of that bundle of nerves, which is shown in Plate III.

58, 59. Nervous filaments, which accompany the arterial branch of the convex margin of the heart.

60, 61. Nerves of the posterior coronary plexus, following the course of the posterior branch of the left coronary artery, and proceeding to the plane surface of the heart.

62, 63. A very minute nervous twig accompanying the reflected branches of the posterior coronary artery towards the plane surface of the heart.

64, 65. Several very long nervous twigs running along with the branches of the posterior coronary artery.

66. Small nerve going to branch No. 65.

67. Two nervous twigs reflected on the anterior surface of the heart, where they are applied upon the anterior branch of the posterior coronary artery.

68. Nervous filaments of the posterior coronary plexus, following the course of the arteries of the auricle and of the posterior venous sinus.

69, 70. Small nervous threads, which, sent off from the great and deep cardiac plexus, behind the pulmonary artery, and above the sinus of the pulmonary veins, after a long course, descend to the plain surface of the heart, where they are united with the nervous filaments of the posterior coronary plexus.

From the origin and distribution of the nerves of the heart, already pointed out in this as well as in the last Plate, it is evident that there are two distinct dispositions of those nerves, viz. one accompanying the anterior coronary artery, the other the posterior coronary artery. Yet these two distributions of the nerves of the heart do not completely correspond to the cardiac nerves from which they are derived, as, that that which is anterior should entirely belong to the right cardiac, and that that which is posterior should correspond solely to the left. For the dissection of this double arrangement teaches us, that the cardiac nerves, in their progress around the large vessels at the base of the heart, anastomose by alternately giving and receiving branches; and, besides, that each plexus is composed and formed by the union of the cardiac nerves of both sides. For the right deep cardiac nerve lying under the arch of the aorta, after giving filaments to form the anterior coronary plexus, the remainder, and that by far the greater part of it, creeps under the pulmonary artery to the posterior surface of the heart, that it may contribute to form part of the posterior coronary plexus at the commencement of the posterior coronary artery. Then, the left great deep cardiac nerve, freed from the posterior coronary plexus, bestows not a few of its filaments, and those pretty large, to increase the anterior coronary plexus. But in even slightly comparing the force of the nerves of either coronary plexus, it is abundantly evident that that distribution of this arrangement of nerves which is carried to the posterior surface of the heart, far surpasses in quantity and thickness that which is distributed upon the anterior surface of the heart: In fine, that each disposition of those nerves follows the unequal proportion of the fleshy mass composing the ventricles of the heart.

71. Eighth pair of the left side.

72. Superficial cardiac branch of the eighth pair of the left side.

73. Anastomosis between the superficial cardiac nerve of the eight pair and the small deep cardiac nerves of the great sympathetic.

74. The first cardiac branch of the eighth pair along with the small deep cardiac nerve of the sympathetic, inserted into the great cardiac plexus.

75. Twigs of the same reflected behind the pulmonary artery to the great cardiac plexus, and accompanying the arteries of the sinus venosus and each ventricle.

76. Recurrent nerve of the left side.

77. Two branches of the recurrent, which, proceeding downwards, are immediately re-

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flected upwards and run towards the great cardiac plexus.

78, 79. Distribution of the recurrent along the left side of the trachea and thyroid gland.

80. Nervous filament formed by twigs from the eighth and recurrent, which dividing directly into several small branches, follows the division of the pulmonary artery and of the bronchia of the same side.

81. A nerve from the eighth, which, very constant in its situation, runs behind the pulmonary artery of the left side to the filaments accompanying the arteries of the sinus venosus and each ventricle.

82, 83. Very small nervous twigs of the same order distributed to the anterior surface of the left lung.

No.

84. Branches of the eighth pair, proceeding more particularly to the left lung, and especially to the divisions of the bronchia.

85. A branch of the nerve No. 80. appearing between the two principal trunks of the pulmonary veins of the left side, and running to the anterior surface of the lung.

86. Trunk of the eighth pair winding behind the left bronchia to the oesophagus.

87, 88. Brachial plexus.

89. Left phrenic nerve.

90. Right phrenic nerve.

91, 92. Very small nervous twigs accompanying the transverse artery of the neck and the internal mammary artery.

PL.V.

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PLATE V.

The Posterior Pulmonary Plexus of the Pneumo-gastric Nerve. The Nerves of the Plain Surface of the Heart.

A—The posterior convex surface of the left lung. The thorax is laid open from behind by the removal of the dorsal part of the vertebral column.

B—The posterior convex surface of the right lung.

C—The substance of the right lung dissected and thrown aside, in order to expose the first divisions of the bronchi and the principal branches of the posterior pulmonary plexus in their mutual relations.

D—Posterior aspect of the trachea beset with many mucous follicles and glands.

E—The left bronchus.

F—The right bronchus.

G, H, I, K, L—The division of the right bronchus into branches.

M—The plain surface of the heart.

N, N—Trunk of the coronary vein.

O—The inferior vena cava cut.

P—The vestige of the foramen ovale covered with a membrane.

Q—The Eustachian valve.

We have taken this opportunity, in order that, by laying open the inferior vena cava from behind, we might show plainly the true seat of this valve to those not conversant with anatomical details. From this disposition of the parts, we think that even those the least practised in dissection will understand that the Eustachian valve completes the inner wall of the *right* auricle, and also that this valve constitutes the limit between the root of the *right* auricle and the inferior vena cava; for which reason this valve hinders very little, as was once thought, the blood of the superior vena cava from pressing on that of the inferior, but rather prevents the blood, when once received into the sinus of the right auricle, from passing easily into the inferior vena cava at the time of the contraction of the right auricle; at least that the blood of the *right* auricle may not at that time force that of the inferior cava too much outwards. Vide Haller, *Elem. Phys.* Lib. IV. Sect. ii. § xiii. The same valve may also in the foetus turn the blood of the inferior cava from the right auricle towards the foramen ovale. Trew, p. 76.

This valve is generally broader whenever its superior free margin is reticulated; when, however, this reticulated structure is wanting, it is narrower.*

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* I here subjoin Haller's Description of the Eustachian Valve, as it agrees exactly with our Plate.

"The Eustachian valve of the vena cava," says he, "is a similunar membranous appendix, projecting from the left side of the right sinus, where the auricle is continuous with the vena cava inferior. I mean by sinus all that expansion bounded on the right and posteriorly by the continuous membrane of the auricle, and opening by a wide orifice to the left and anteriorly into the auricle, posteriorly into the ventricle; from it the inferior vena cava is continuous upwards. In this sinus the valve originates between the vestige of the *foramen ovale* and mouth of the great coronary vein, a little lower down than the middle of the vestige of the foramen ovale, but more to the right and higher up than the coronary vein, near the posterior termination of the right auricle, into the left column of the isthmus of Vieussens. It then ascends by the margin which limits the auricle, where it adheres by a semicircular connexion to the sinus, first to the left, then upwards, and finally to the right side, gradually thinning away from the place

R—Columnae carneae at the entrance of the right ventricle of the heart.
S—Sinus of the pulmonary veins.
T, U—The two principal trunks of the pulmonary veins of the right side.
V—Pulmonary artery.
W—Thoracic aorta.
X—Left subclavian artery.
Y—Arteria innominata.
Z—Oesophagus.
a—First dorsal vertebra.
b.—The *superior* œsophageal artery.
c.—The right bronchial artery.

This artery pretty frequently arises by a common trunk along with the superior aortic intercostal artery. In this way HALLER has distinctly drawn it.—*vid.* Fasc. III. Fig. 1. Not unfrequently, however, this right bronchial artery comes off from the aorta by a single trunk, and runs to the right bronchus.

d, *e*, *f*, *g*.—Branches of the right bronchial artery, ramified near to, and upon the bronchia of the same side.
h.—Right coronary artery, where it is turning round to the plain surface of the heart.
i, *k*, *l*.—The principal branches of the *right* coronary artery distributed on the plain surface of the heart.
m.—A branch of the left coronary artery gliding to the plain surface of the heart.
n.—The *middle* vein of the heart. HALLER, *De Vasis Cordis Propriis.*
o, *p*.—Branches of the coronary vein running towards their common trunk N.
q.—A small artery of the left sinus venosus of the heart.
r.—Small veins creeping round the sinus of the pulmonary veins.
s.—A branch of the bronchial artery under the first division of the trachea, distributed to the bronchial glands.
1. The Pneumo-gastric nerve of the right side.
2. Right recurrent nerve.
3. Branches of nerves from the recurrent and Pneumo-gastric, some of which, going up towards the trachea, are called *ascending*, others running downwards are called *descending*.
4. The *smaller posterior* œsophageal plexus of the Pneumo-gastric.
5. Filaments of the Pneumo-gastric particularly devoted to the œsophagus.
6, 7, 8. Nervous filaments of the Pneumo-gastric, partly distributed to the fleshy glandular substance of the trachea, partly winding round the œsophagus.
9. Branches from the Recurrent and Pneumo-gastric, forming the anterior pulmonary plexus. Tab. III. No. 31, 32, 33.
10. A fasciculus of nerves from the Pneumo-gastric, distributed to the commencement of the right bronchus.
11. A remarkable nervous branch of the *posterior* pulmonary plexus of the Pneumo-gastric accompanying the right bronchus.
12, 13, 14, 15, 16. The intricate distribution of this nervous branch to the first division of the bronchus.
17, 18, 19. A very strong branch of the same nervous cord following the second and third divisions of the bronchus, running above and behind the pulmonary air-tubes, and now and then inserted into them.
20, 21, 22. Other smaller nerves of the *posterior* pulmonary plexus of the Pneumo-gastric, running to the trunk of the right bronchus.
23. The mutual union of the same, and the distribution of each into the pulmonary air-tubes.
24. Another remarkable nervous cord of the *posterior* pulmonary plexus of the Pneumo-gastric, following the branches of the right bronchus.
25, 26, 27. Twigs of the same nervous cord No. 24. going to the second division of the right bronchus, and distributed to it.
28, 29, 30, 31, 32. The division of the nervous cord No. 24. into still smaller branches, cor-

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of its posterior origin, until it terminates in the anterior situation of the limit of this auricle, coursing along its base. Its figure is in general semilunar, its greater circumference nearly equal to a semicircle, the interior and free edge to a segment of a smaller circle. It is broadest in the middle, perceptibly diminishing toward the large circumference. In the natural state, this membrane is double; looking in towards the sinus, it is tense and powerful, but, near its posterior termination particularly, it is completely reticulated, having its fibres either intricately arranged in open spaces, or expanded and interwoven over a very thin membrane, so that a reticulated layer remains when this thin membrane has been removed by dissection. It so rarely presents this reticulated appearance, that it would appear to be in most instances praeternatural. Taken altogether, it is horizontal, slightly concave towards the auricle, and convex towards the vena cava inferior. It is always present in the foetus, and I have never in any example seen it entirely wanting in the adult.—*Opera. Min. Nuperae Observ. de Valvula Eustachii,* § iv.

responding exactly to the divisions of the right bronchus seen in that region of the lung.

33. Another very remarkable branch of the nerve No. 24, going behind the bronchus L. Moreover, the same cord, being separated into smaller and smaller branches, frequently penetrates in its course the pulmonary air tubes in the same manner as the nerve No. 28, and having become very small, is distributed to the bronchi themselves.

All these nerves taken together, and following the divisions of the bronchi, form what is called the posterior pulmonary plexus of the Pneumo-gastric; concerning which, *vid.* HALLER, *Elem. Phys.* Lib. viii. Sect. ii. § xxv. WALTERI, Tab. iii. No. 406, 407.

GALEN had taught, "that the lung received from the sixth union of the cerebral nerves only two very small ones, which are distributed to the outside of the pleura, and do not extend to the substance of the lung; therefore," adds he, "no pain troubles those who throw up blood from the lungs."—*De Loc. Affect.* Lib. iv. cap. 5. VESALIUS asserted the same thing, when he mentioned the little complaint made by those whose lungs are in a state of suppuration.—*Exam. Observ. Falloppii*, pag. 109. VESALIUS freely used this argument, that he might also on this occasion find fault with FALLOPPIUS, who, contrary to the opinion of all anatomists of his time, had long taught, that the lung received *more than two small nerves*. "For these very nerves, of the sixth pair of each side, (Pneumo-gastric,) says FALLOPPIUS, when they pass by the roots of the lungs, give off many filaments, not to the pleura only, but to the branches of the trachea, along with which they are distributed to the whole lung."—*Obs. Anat.* pag. 154. Hence FALLOPPIUS truly pointed out and described the nerves of the lungs more wisely and carefully than preceding and even later anatomists. For he clearly showed, that there were not few, but many of these nerves which go to the lungs; and what is remarkable, that these filaments do not indiscriminately follow any kind of pulmonary vessels, but being first connected with the Branches of the Bronchi, chiefly accompany the air-tubes.

Nevertheless, almost all clinical observers continue to assert, along with GALEN and VESALIUS, that the lung has not much feeling; nor are there wanting amongst the practitioners of our day some, who, by ascribing the seat of pleuritis to the pleura, and not to the lungs, altogether deny sensation to them. In this they are chiefly supported by the authority of HALLER, who says, that in living *animals the lung can be cut without any agitation of the animal*,—loc. cit. On which subject, whilst physicians shew great anxiety in endeavouring to establish their own opinions, they seem to us unfairly to conceal the fact, or to dissemble, that the lung is not always insensible, neither does it shew itself to be so in all the affections to which it is liable, and which differ so much from each other, as well in their situation as disposition; nay, they are forced to confess that the lung is affected with vehement and acute pain in Peripneumonia vera, in recent ulcers affecting the air passages, in Phthisis calculosa, and the like.

Since, then, Anatomy shews that the lungs receive an abundant supply of large nerves from the *anterior* and *posterior* pulmonary plexus of the Pneumo-gastric, we think this sufficient to forbid us to deny to this viscus altogether the faculty of sensation. But since we cannot deny, that the lungs do not at all sometimes shew sensibility proportionate to the apparatus of nerves, a question now arises, not unworthy the attention of physiologists, viz. why the lung, although sufficiently well supplied with nerves, should sometimes experience pain in a moderate degree, or not at all, and sometimes exquisitely severe.

I think that Dissection clearly shows the cause and reason of these phenomena. Indeed, the nerves of the lungs, strictly speaking, were not altogether created for the cellular and vascular texture of these organs, but chiefly for the bronchi and air tubes; for those nerves are but small which are distributed to the very outer surface of this viscus, or which accompany the blood-vessels more deeply; then the greatest part of the *pulmonary plexus* embraces the divisions of the bronchia, and united to these by numerous twigs, penetrates by particular orifices the larger and the smallest air tubes whereever they are extensively distributed through the lung: it altogether sup-

plies to these air tubes, to their fleshy fibres and internal membrane, a great number of nervous twigs, on account of which they possess that exquisite feeling known to every one. Wherefore, if the principal seat of the sensation which the lung enjoys reside in the bronchi and air passages, it is easy to determine why, in diseases affecting the surface of the lungs, and also in those which occupy the *interlobular* cellular tissue, only an obtuse, or, as physicians call it, an *oppressive sensation*, arises, and then why an acute pain, with a severe cough, troubles those in whom inflamed and suppurating bronchial tubes are injured by calculous concretions or any other sort of irritation.

Indeed, Peripneumony by *transudation of blood*, (Haller, *Opusc. Patholog. Observ* XVI. XVII.) in which such an effusion of blood sometimes takes place into the interlobular cellular tissue, that a great part of the lung at length becomes quite black, deceives by a mild beginning, nor does any acute pain precede the suffocation and ultimate destruction of the patient. In like manner, in dropsy of the substance of the lung, that is, an effusion of water into the interlobular cellular tissue of this viscus, except the sensation of weight and difficult respiration, no acute pain disturbs the patient. Tubercles, vomicæ, and other affections of the cellular tissue, except those implicating the bronchi and air passages of the lobules, take their origin without being noticed, and sometimes go on for a long time without pain.

Sometimes, in genuine Peripneumony, when the inflammation chiefly rages in the bronchi and air passages, (for which reason this disease ought rather to be called *Bronchitis* than Peripneumony,) Vid. *Franck de Curand. Hom. Morb.* Vol. II. § 173, pain in the lung foretels the invasion of the disease, which, by the increase of the malady, becomes most acute, pungent, with remarkable constriction at the sternum, panting, cough, and frothy, viscid, and bloody spitting; which symptoms, moreover, very much resembling those which accompany *Cynanche Laryngea*, indicate, in true Peripneumony, that the divisions of the trachea, not less endowed with acute sensation than the trachea itself, labour under inflammation.

But both the increased sensibility of the lung, and the pain, as soon as pus makes way for itself within the air tubes, indicate the presence of a vomica, which has lurked a sufficiently long time in the interlobular cellular tissue of the lungs. For as much as a titillation then first commences in the thorax, which is followed by pain with a sense of constriction at the sternum, troublesome cough, bloody, purulent, and fœtid spitting, and afterwards by an abscess having a free communication with the bronchi.

In the last place, we think that the phenomena of convulsive Asthma must be looked for from no other cause than this close connexion of the nerves of each pulmonary plexus with the bronchi. Indeed, under a paroxysm of this obstinate disease, it is clearly perceived, whilst you would almost say the cellular and vascular texture of the lungs were free of it, that the divisions of the bronchi alone suffer the force of the disturbed action of the nerves of the lungs, to which the spasmodic contractions of the fleshy fibres, which are dispersed between the cartilaginous pieces of the bronchi, exactly correspond, then the crowding and rigidity of those air tubes as they are widely distributed through the lungs, whence follow that short breathing and whistling respiration, with fruitless attempts at coughing, and sense of weight around the praecordia, and other similar symptoms which accompany spasmodic affections of the air passages of the lungs. But these phenomena are sometimes produced, as the practice of medicine shows, from a collection of crude phlegm lurking in the stomach and interrupting its actions; because the same order of nerves which supply the stomach likewise governs the life, sensibility, and action of the fleshy fibres which are interspersed in the bronchi. And, since there is not the smallest doubt that the nerves of the stomach sympathise with the whole system of nerves, wherever there is cause for such a phenomenon, much less ought we to doubt that the branches of the Pneumo-gastric distributed to the stomach maintain a sympathy with the remarkable pulmonary plexus of that nerve extensively disseminated through the bronchia.

34, 35, 36. The Pneumo-gastric nerve of the right side, where its division begins to surround the oesophagus in several ways behind the bronchus.

37, 38, 39. Great oesophageal plexus of the Pneumo-gastric, joined together by twigs from the nerve of each side.

40, 41. Certain nervous filaments distributed to the substance of the oesophagus itself. Walter, Tab. III. No. 442, 444, 454.

42. Two filaments of the Cardiac nerves, which accompany the right coronary artery, runing to the plain surface of the heart.

43. Anastomosis of the same nerves, with some very slender twigs from the great Cardiac plexus, descending between the inferior vena cava and the sinus of the pulmonary veins.

44, 45, 46, 47, 48. Those small nerves accompanying the branches of the right coronary artery, which are distributed to the plain surface of the heart.

49. Small nerves from the number of those which follow the branches of the left pulmonary artery, which turn to the plain surface of the heart. Vid. Tab. IV. No. 63. *h*.

These are, therefore, the nerves, generally branches of those which look to the plain surface of the heart, which, being given off from each coronary plexus, follow the flexuous arteries of the same name to the plain surface of the heart; where, as soon as they have arrived, although they join the trunk of the coronary vein, and the numerous branches running to it, none, however, accompany these tubes, but, having passed them, they hasten to the arterial branches, whose direction they follow for a short way, but how far they lurk together in the flesh of the heart has not been shown any other where than from its convex surface. The nervous filaments are generally more slender in this part of the heart than on its convex surface, although it has frequently happened, among the many examinations instituted by us, that we also found this part very conspicuous for the size of the nerves, especially in those subjects in whom the heart was remarkable for its size and fleshiness. All which things, moreover, will appear more clear by the inspection of the following Plate.

Fig.1.

Fig.2.

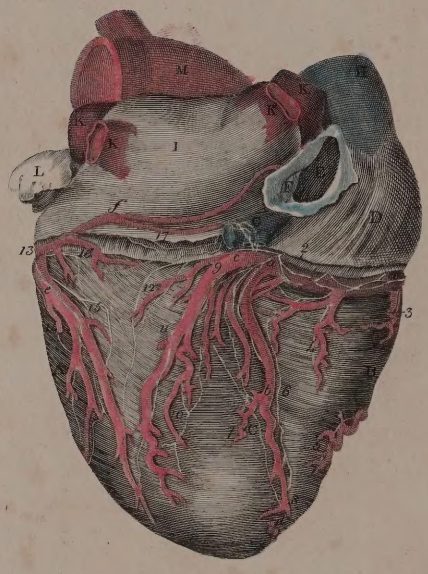


PLATE VI.

Another Specimen of the Nerves of the Heart.

Figure I.

Superior Convex Aspect of the Heart.

A—The superior convex aspect of the heart projecting posteriorly, which contains the left ventricle.

B—Slanting surface of the heart, which stretches downwards and conceals the right ventricle.

C—The obtuse margin of the heart.

D—The acute margin of the heart.

E—Right auricle of the heart.

F—Right *sinus venosus* of the heart.

G—Superior vena cava.

H—Left auricle.

I—Pulmonary artery.

K—Aorta.

a, a.—Trunk of the *right* coronary artery, which is at the same time inferior and anterior to its fellow of the left side.

b.—A branch of the *right* coronary artery, which goes to the right auricle of the heart and the superior vena cava, inosculating at the same place with a small branch of the left coronary artery.

c.—A branch of the *right* coronary artery stretching round the root of the pulmonary artery, and which, being generally joined with the first branch of the *left* coronary artery, forms a net-work, from which the pulmonary artery and the adjoining substance of the heart receives twigs.

d, e.—Smaller branches going to the right *sinus venosus* of the heart.

f, g, h, i.—*Nameless* branches of the *right* coronary artery creeping over the convexity of the right ventricle of the heart.

k.—The *left* coronary artery, superior, and posterior to the *right*, and generally larger.

l.—A *larger* branch of the *left* coronary artery, which descends along the obtuse margin of the heart, and the seat of the septum cordis, chiefly anterior as far as the apex.

m, n, o, p.—Deep twigs of the larger branch of the *left* coronary artery to the septum cordis hid in that depression.

q.—A remarkable branch of the *larger* branch of the *left* coronary artery, distributed to the convexity of the left sinus of the heart.

r, s.—Two branches almost parallel going off from the principal trunk of the *left* coronary artery, and stretching down over the uneven surface of the obtuse margin of the left ventricle of the heart.

t.—A *smaller* branch of the *left* coronary artery, which being reflected along the depression between the left ventricle of the heart and the auricle of the same side, first backwards and upwards, and then forward, namely, along the obtuse margin, runs toward the plain aspect of the heart.

u, v, x, y.—Twigs of the *smaller* branch of the *left* coronary artery sent to the left auricle of the heart.

1. The right coronary plexus of nerves which are proper to the heart. Vid. Tab. III. No. 124. Tab. IV. No. 37.
2. A nervous zone embracing the root of the aorta, and running into the right coronary plexus. Tab. III. No. 119.
3. Filaments of the right coronary plexus accompanying the trunk of the *right* coronary artery. Moreover, some nerves of this order, neither deficient in number nor size, and covered by the trunk of the right coronary artery, go and penetrate along with small arteries the summit of the right ventricle of the heart.

4, 5, 6, 7, 8, 9, 10. Nervous twigs of the right coronary plexus, which, along with *nameless* arteries, penetrate the substance of the right ventricle.

11. A filament from the left Cardiac plexus stretched to the right side of the heart.

12. Left or *posterior* coronary plexus. Tab. IV. No. 54.

13, 14. Filaments of the left coronary plexus accompanying the *larger* branch of the *left* coronary artery.

15. A pretty strong branch in the depression of the *septem ventriculorum*, penetrating along with an artery the septum itself.

16, 17. Remarkable branches of the left coronary plexus accompanied by arteries which go along the convex margin of the left ventricle of the heart.

18, 19. Filaments of the left coronary plexus reflected along with a *smaller* branch of the *left* coronary artery to the plain surface of the left ventricle.

Figure II.

The Plain Surface of the Heart.

A—Obtuse margin of the heart.

B—Acute margin of the heart.

C—A linear depression which marks the seat and direction of the septum cordis.

D—Right sinus venosus.

E—The mouth of the inferior vena cava.

F—The vestige of the *foramen ovale* which existed in the foetus.

G—Part of the cut trunk of the coronary vein.

H—Vena cava superior.

I—Sinus of the pulmonary veins.

K, K, K, K.—The principal trunks of the pulmonary veins.

L—Left auricle of the heart.

M—Aorta.

a, a,—The *right* coronary artery reflected to the compressed surface of the heart around its acute margin, and between it and the root of the right *sinus venosus*.

b,—A branch of the *right* coronary artery, companion of the *vena media*.

c,—A remarkable branch of the *right* coronary artery, which, stretching far backwards, reaches nearly as far as the obtuse margin of the heart. Indeed, this very free division of the right coronary artery into branches over the plain side of the heart is not constant, as Haller has remarked, in treating of the *proper vessels of the heart, (de vasis cordis propriis,)* but the general distribution is in Tab. V. *k. l.*

d,—The apex of the *larger* branch of the *left* coronary artery, which sometimes meets the flexure of the *vena media* beyond the point of the heart.

e,—The *smaller* branch of the *left* coronary artery proceeding round the obtuse margin of the heart to the plain surface of the left ventricle. Fig. I. *t.*

f,—An artery of the sinus of the pulmonary veins coming from the *smaller* branch of the *left* coronary artery; concerning which, vid. Halleri *Icon. Anat Fasc.* viii. (1.)

1, 2. Nervous filaments of the right coronary plexus which, along with the *right* coronary artery, run round the acute margin of the heart to the plain surface of this viscus.

3, 4, 5, 6, 7, 8. Nervous twigs of the right Cardiac plexus, which, along with arteries, are distributed to the plain surface of the right ventricle of the heart.

9, 10, 11, 12. Nervous filaments of the right Cardiac plexus, accompanying branches of the *right* coronary artery, which are distributed to the plain surface of the left ventricle of the heart.

13, 14, 15, 16. Nervous twigs of the left coronary plexus, Fig. I. 18 19, running along with a *smaller* branch of the *left* coronary artery to the plain region of the left ventricle of the heart, and penetrating along with smaller arteries the substance of the ventricle itself.

17. Two very slender nervous filaments given off above the heart from the *great Cardiac plexus*, which, after running a long course above the sinus of the pulmonary veins, at length enter near the insertion of the trunk of the coronary vein into an anastomosis with the nervous filaments accompanying the *right* coronary artery.

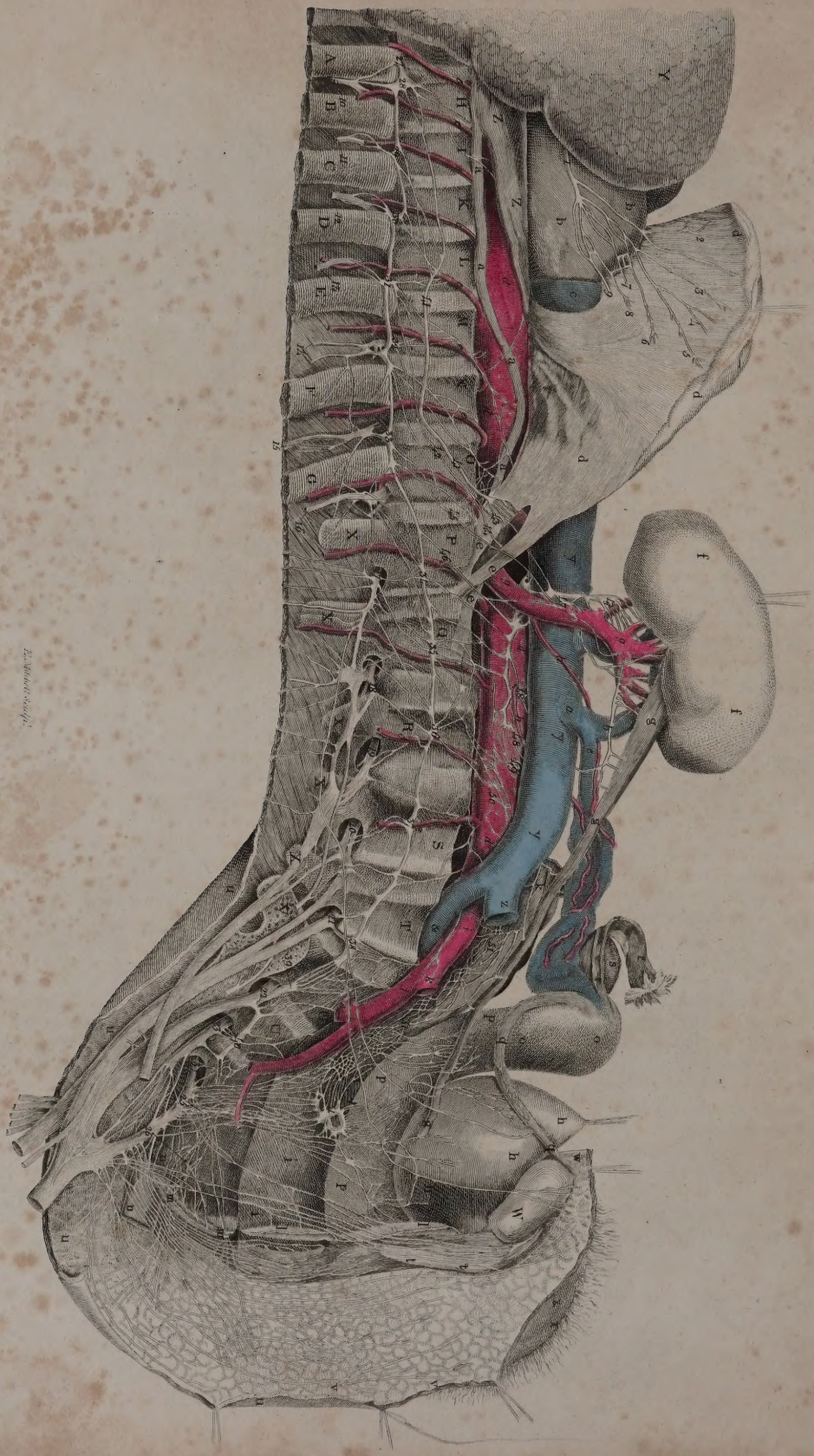


PLATE VII.

This Plate represents the Sympathetic Nerve, from the sixth Rib to the third bone of the Sacrum, of the right side; also, the six inferior Dorsal, the Lumbar and Sacral Nerves. The Os Innominatum has been removed, that the parts situate in the interior of the Pelvis, and the nerves going to them, might be better seen.

A. B. C. D. E. F. G. The seven lower ribs.
H. I. K. L. M. N. O. The seven lower dorsal vertebræ.
P. Q. R. S. T. The lumbar vertebræ.
U, U. The sacrum.
V. The lateral part of the sacrum, cut with a saw near the foramina, where the first and second sacral nerves pass out.
W. Cartilage of the left os pubis.
X, X, X, X, X. Transverse processes of the lumbar vertebræ.
Y. Inferior lobe of the right lung.
Z, Z. A portion of the pleura which formed the posterior mediastinum.
a, a, a, a. The thoracic duct drawn a little from its natural situation between the vena azygos and aorta.
b, b. The pericardium enclosing the heart.
c. The vena cava inferior entering the thorax by the opening in the cordiform tendon of the diaphragm.
d, d, d. The diaphragm separated from the ribs.
e, e, e. Crura of the diaphragm.
f, f. The right kidney removed from its natural situation, being drawn upwards and to the left side.
g, g, g. The ureter.
h, h, h. The urinary bladder.
i, i, i. The rectum.
k. Termination of the sigmoid flexure of the colon.
l, l. Levator ani muscle.
m, m. Ischio-coccygeus muscle.
n, n. Sacro-ischiatic ligament.
o, o. The uterus drawn upwards and to the left side.
p, p, p. Vagina.
q, q, q. Round ligament of the uterus.
r, r, r. Fallopian tube.
s. Ovary.
t, t. Corpus cavernosum clitoridis with its erector muscle adhering to it.
u, u, u, u. The skin of the nates and perineum.
v, v. The skin covering the inner surface of the thigh and pudendum.
w. Skin of the mons veneris.
x, x. Labia majora.
y, y, y. The vena cava drawn from its natural situation upwards and to the left side.
z. Right iliac vein, cut.
&. Left iliac vein.
a. Common trunk of the right renal vein, *b*, and of the right spermatic vein, *c*.
d, d, d, d. Aorta.
e, e, e, e, e, e, e. Aortic intercostal arteries.*
f, f, f, f. Lumbar arteries.
g, g. Renal artery.
h, h. Spermatic arteries.
i. Right common iliac artery.
k. Right external iliac artery, cut.
l. Right internal iliac artery.
1. Phrenic nerve.
2. 3. 4. 5. 6. 7. 8. Branches of this nerve to the convex surface of the diaphragm.
9. A branch of the phrenic nerve, which anastomoses with one or more twigs of the sub-diaphragmatic plexus which comes from the solar: this anastomosing branch passes through a small hole in the diaphragm on the right side of the opening for the vena cava.
The rest of this nerve is seen in plate viii. 7, 7.
10. 11. 12. 13. 14. 15. 16. The anterior branches of the sixth, seventh, eighth, ninth, tenth, eleventh and twelfth dorsal nerves.
17. 18. 19. 20. 21. The anterior branches of the first, second, third, fourth, and fifth lumbar nerves.
22. 23. 24. 25. 26. The anterior branches of the first, second, third, fourth and fifth sacral nerves.

* The artery which runs along the lower margin of the twelfth rib, although not an intercostal artery, strictly speaking, is however generally called the last intercostal.

27. The sympathetic nerve cut between the fifth and sixth dorsal ganglions.

28. 29. 30. 31. 32. 33. The sixth, seventh, eighth, ninth, tenth, and eleventh thoracic ganglions of the sympathetic nerve. They communicate each, by one or more twigs, with the dorsal or intercostal nerves.

34. 35. 36. 37. 38. The first, second, third, fourth, and fifth lumbar ganglions of the sympathetic nerve. They receive branches of communication from the lumbar nerves, in the same way as the thoracic ganglions communicate with the dorsal nerves, but their branches of communication are longer, because the sympathetic nerve in the loins is situated more on the fore part of the vertebræ, and consequently farther removed from the lumbar intervertebral foramina.

39. 40. Sacral part of the sympathetic nerve.
For a more complete view of this part of the sympathetic nerve vide plate xi. of this series.

41, 41. The trunk of the greater splanchnic nerve, formed by the union of branches proceeding from the sixth, seventh, and eighth thoracic ganglions of the sympathetic. It proceeds obliquely downwards on the fore and lateral part of the vertebral column; and, having arrived at the diaphragm, it divides into four branches, which perforate its crura to get into the abdomen.—*Vide* plate viii. 4.

42. Trunk of the smaller splanchnic nerve, proceeding into the abdomen, between the crura of the diaphragm, where it immediately divides into two branches—a superior and inferior.

43. The superior branch joining the greater splanchnic.

44. The inferior branch: this not only joins the semilunar ganglion of the sympathetic, but also the renal plexus.

45. The posterior and superior renal nerve, formed by the union of branches from the tenth and eleventh ganglions of the sympathetic nerve.

46. Posterior and inferior renal nerve. This anastomoses with the former.

47, 47. Renal plexus.

48, 48. Spermatic plexus.

49. Inferior mesenteric plexus.

50. Aortic plexus.

51, 51, 51. The hypogastric plexuses sending branches to the rectum, uterus, vagina, urinary bladder, &c.

PLATE VIII.

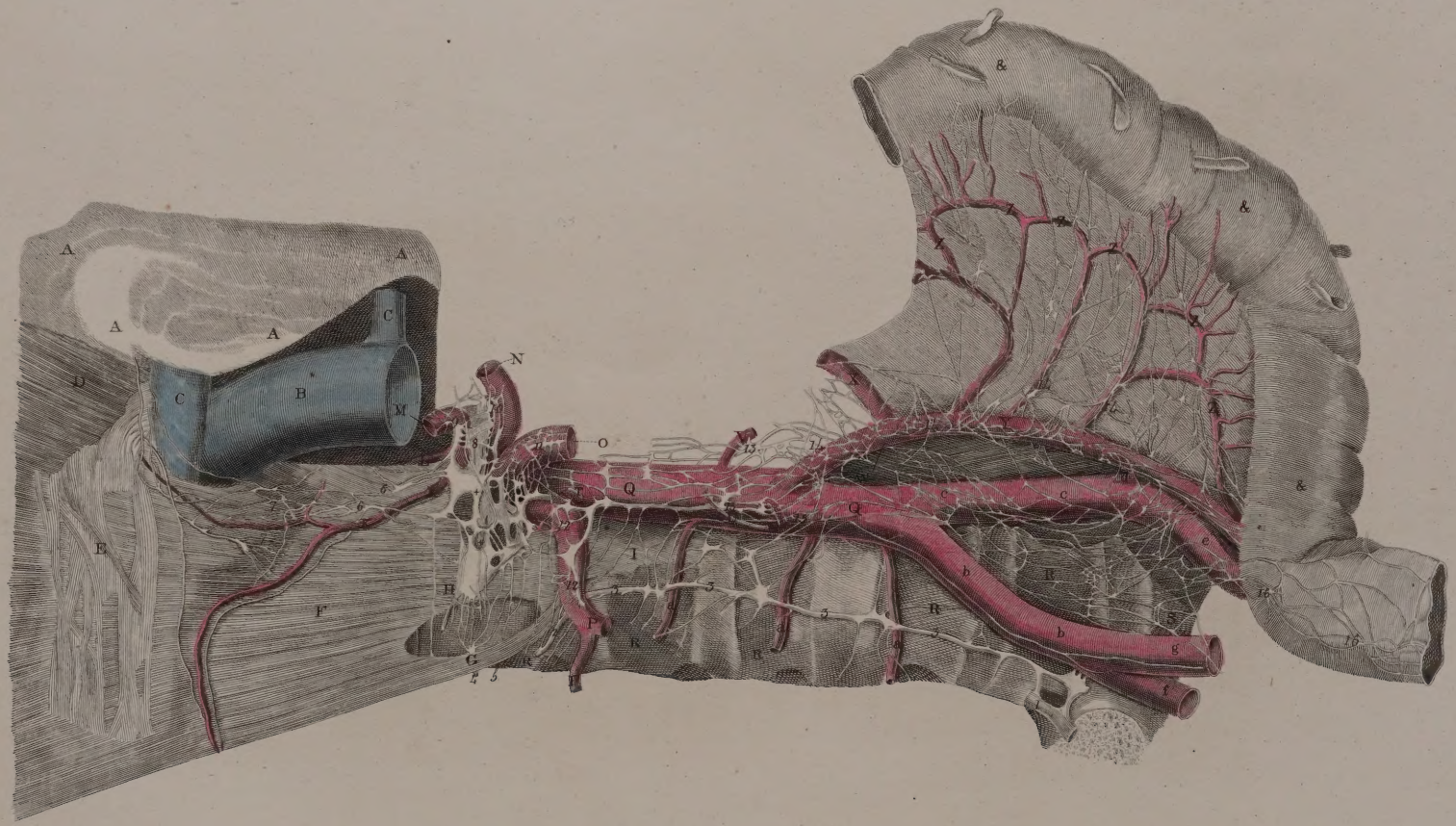
This explains the origin and disposition of the Semi-lunar Ganglion, or rather of the Cœliac Ganglions of the right Side; it shows the Renal and Spermatic Ganglions of the right Side and their anastomosis with the Ganglions of the left Side, the Origin of the Superior Mesenteric Plexus, also the Inferior Mesenteric Plexus, and the right Hypogastric Nerves.

A A, A, A. The lower surface of the right lobe of the liver thrown aside.
B. Vena cava inferior.
C, C. Branches from the liver to the vena cava.
D, E, F, G, H, I. The Diaphragm.
K, K. Right phrenic artery.
L. Common trunk of the coronaria ventriculi and left hepatic artery.
M. Right hepatic artery.
N. Splenic artery.
O. Superior mesenteric artery.
P, P. Right renal artery, cut.
Q, Q. Aorta.
R, R, R, R, R. The five Lumbar Vertebrae.
S. First bone of the sacrum.
T. Superior right spermatic artery.
U. Inferior right spermatic artery.
V. Left spermatic artery.
W. Trunk of the inferior mesenteric artery.
X. Ascending branch of the inferior mesenteric artery.
Y. Descending branch of the inferior mesenteric artery.
Z, Z, Z, Z, Z, Z. Twigs from the descending branch of the inferior mesenteric artery going to
&, &, &. The sigmoid flexure of the colon.
a, a, a. Lumbar arteries.
b, b. The right iliac artery.
c, c. Left iliac artery.
d. Left internal iliac artery.
e. Left external iliac artery.
f. Right internal iliac artery.
g. Right external iliac artery.
1. The anterior branch of the fifth lumbar nerve.
2. Trunk of the sympathetic nerve, or communicating branch between the last thoracic and first lumbar ganglion.
3, 3, 3, 3. Continuation of the sympathetic nerve along the side of the lumbar vertebræ; it consists of ganglions joined together by communicating branches. The lumbar ganglions are generally five in number, sometimes only two or three exist; they communicate with the anterior branches of the lumbar nerves, and they send off *internal* branches which form the aortic plexus.
4. Trunk of the great splanchnic nerve, which, after dividing into four branches, terminates in the semilunar ganglion.
5. The trunk of the smaller splanchnic nerve. This is formed of two branches, which come from the tenth and eleventh thoracic ganglions; when it has passed through the diaphragm into the abdomen it divides into two branches, a superior and an inferior, the former anastomoses with the great splanchnic nerve, the latter joins the semilunar ganglion and the renal plexus.

From these two nerves on each side, there arise the *semilunar ganglions* which are surrounded with a collection of other ganglions varying in number and size, but all connected together, so as to form a vast network, which is called the *solar plexus.** * This plexus, which receives some filaments from the pneumo-gastric, surrounds that part of the aorta where the cœliac artery arises; the ganglions which compose it are therefore called by Walther the author of this plate, the *cœliac ganglions.*

Productions of this plexus accompany the different arteries from the aorta: thus
6, 6. The sub-diaphragmatic plexus, which accompanies the phrenic arteries and anastomses, with
7, 7. The phrenic nerve.
8. The cœliac plexus surrounds the cœliac artery, and gives off
9. The hepatic plexus which accompanies the hepatic artery.
10. The splenic plexus which surrounds the splenic artery.
11. The superior mesenteric plexus which surrounds the superior mesenteric artery.
12, 12. Renal plexus around the renal artery.
13, 13. Spermatic plexus, on the spermatic artery.
14, 14, 14, 14. Inferior mesenteric plexus and its subdivisions.
15. The aortic plexus, (3, 3, 3.)
16, 16. Part of the hypogastric plexus.

PL. VIII.



E. Mitchell fculp.

PL. IX.

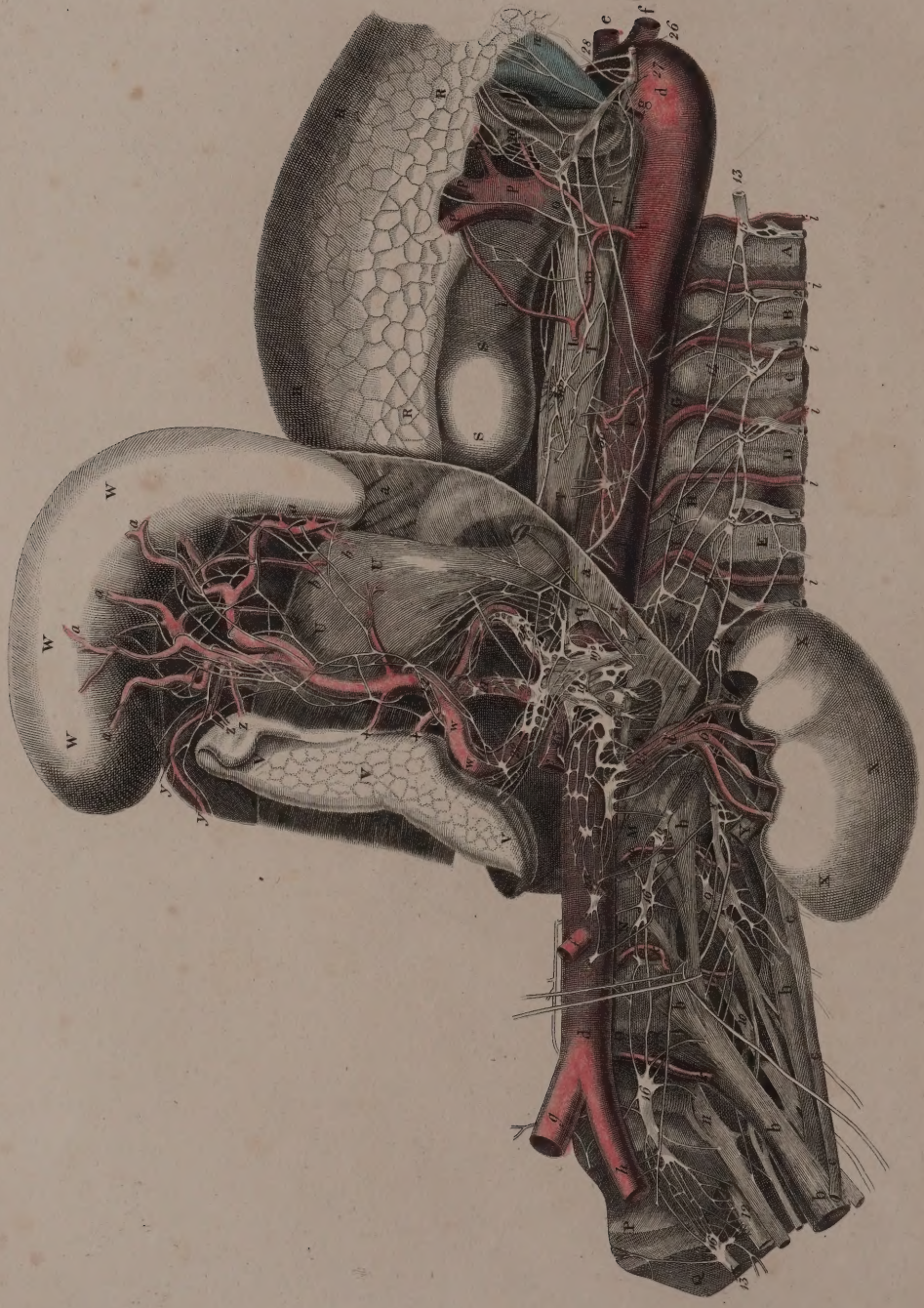


PLATE IX.

This shows the Sympathetic and Pneumo-Gastric Nerves of the left side. The part of the Sympathetic Nerve represented, extends from below the sixth Rib to the first bone of the Sacrum.

A. The seventh rib.
B. The eighth rib.
C. The ninth rib.
D. The tenth rib.
E. The eleventh rib.
F. The twelfth rib.
G. The ninth dorsal vertebra.
H. The tenth dorsal vertebra.
I. The eleventh dorsal vertebra.
K. The twelfth dorsal vertebra.
L. The first lumbar vertebra.
M. The second lumbar vertebra.
N. The third lumbar vertebra.
O. The fourth lumbar vertebra.
P. The fifth lumbar vertebra.
Q. The first bone of the sacrum.
R, R, R, R. The left lung.
S, S. The pericardium containing the heart.
T, T, T. The Oesophagus.
U, U, U, U. The stomach.
V, V, V. The pancreas.
W, W, W. The spleen.
X, X, X. The left kidney.
Y. The ureter.
Z, Z. The left bronchus.
a, a, a. The diaphragm.
b, b, b, b, b, b. The psoas magnus muscle. The fibres have been split up and separated from each other, to show distinctly the exit of the lumbar nerves and the origin of the lumbar ganglions.
c, c, c. The psoas parvus.
d, d, d. The aorta.
e. The left carotid artery.
f. The left subclavian.
g. The remains of the ductus arteriosus.
h. The superior left bronchial artery.
i. The Oesophageal artery from which arises
k. The inferior left bronchial artery, cut.
l, l. The inferior left bronchial artery, cut at its origin from the artery i, going to the left bronchus.
m. Anastomosis between the superior and inferior left bronchial arteries.
n, n. Left pulmonary artery.
o, o. Left venous sinus.
p, p, p, p, p. Pulmonary veins.
q. Trunk of the coeliac artery.
r, r. Left phrenic artery.
s. The common trunk of the left hepatic artery and coronaria ventriculi.
t. Left hepatic artery.
u. Coronaria ventriculi.
v. Right hepatic artery.
w, w. Splenic artery.
x, x. Prancreatic branches.
y, y. Arteria gastro-epiploica sinistra.
z, z. Twigs from the last artery to the pancreas.
a, a, a, a. Proper splenic branches.
b, b, b. Vasa brevia.
c. Trunk of the superior mesenteric artery.
d. Left renal artery.
e. Left spermatic artery.
f. Inferior mesenteric artery.
g. Right common iliac artery.
h. Left common iliac artery,
i, i, i, i, i, i. The fourth, fifth, sixth, seventh, eighth, and ninth aortic intercostal arteries.
k, k, k. The third, fourth, and fifth lumbar arteries.
1. Sixth intercostal nerve of the left side.
2. Seventh intercostal nerve.
3. Eighth ————————
4. Ninth ————————
5. Tenth ————————
6. Eleventh ————————
7. Twelfth ————————
8. The first lumbar nerve.
9. The second ————————
10. The third ————————
11. The fourth ————————
12. The fifth ————————
13. The sympathetic nerve of the left side extending from below the sixth rib to the first bone of the sacrum.

14, 14. The greater splanchnic nerve. This rises by four or five roots from the inner part of the sixth, seventh, eighth, ninth and sometimes the tenth thoracic ganglions.

15, 15, 15, 15, 15, 15. The sixth, seventh, eighth, ninth, tenth, and eleventh thoracic ganglions of the sympathetic nerve.

16, 16, 16, 16. The first, second, third, and fourth lumbar ganglions of the sympathetic nerve.

17. The smaller splanchnic nerve.

18. Anastomosis between the smaller and the greater splanchnic nerves.

19, 19, 19. The Coeliac ganglions composing the solar plexus.

20. Plexus surrounding the common trunk of the left hepatic artery and the coronaria ventriculi.

21. Plexus surrounding the right hepatic artery.

22, 22. The splenic plexus; some of the filaments of this plexus enter the pancreas with the pancreatic branches of the splenic artery, others accompany the left gastro-epiploic artery, and are partly lost in the great omentum.

23. The superior mesenteric plexus.

24. The renal plexus.

25. Spermatic plexus.

26. The trunk of the pneumo-gastric nerve, left side.

27. The recurrent laryngeal turning up behind the arch of the aorta.

28. Cardiac branches of the pneumo-gastric.

29. Branches of the pneumo-gastric nerve to the lungs forming the posterior pulmonary plexus. After having given off the pulmonary branches, the different filaments into which the pneumo-gastric nerves had been separated again unite to form two long cords which run down along the oesophagus, and freely communicate with each other forming

30, 30. The œsophageal plexus.

The pneumo-gastric nerves now enter the abdomen by passing through the diaphragm along with the oesophagus, and are distributed to the stomach and the neighbouring organs, intermixing with the numerous productions of the solar plexus.

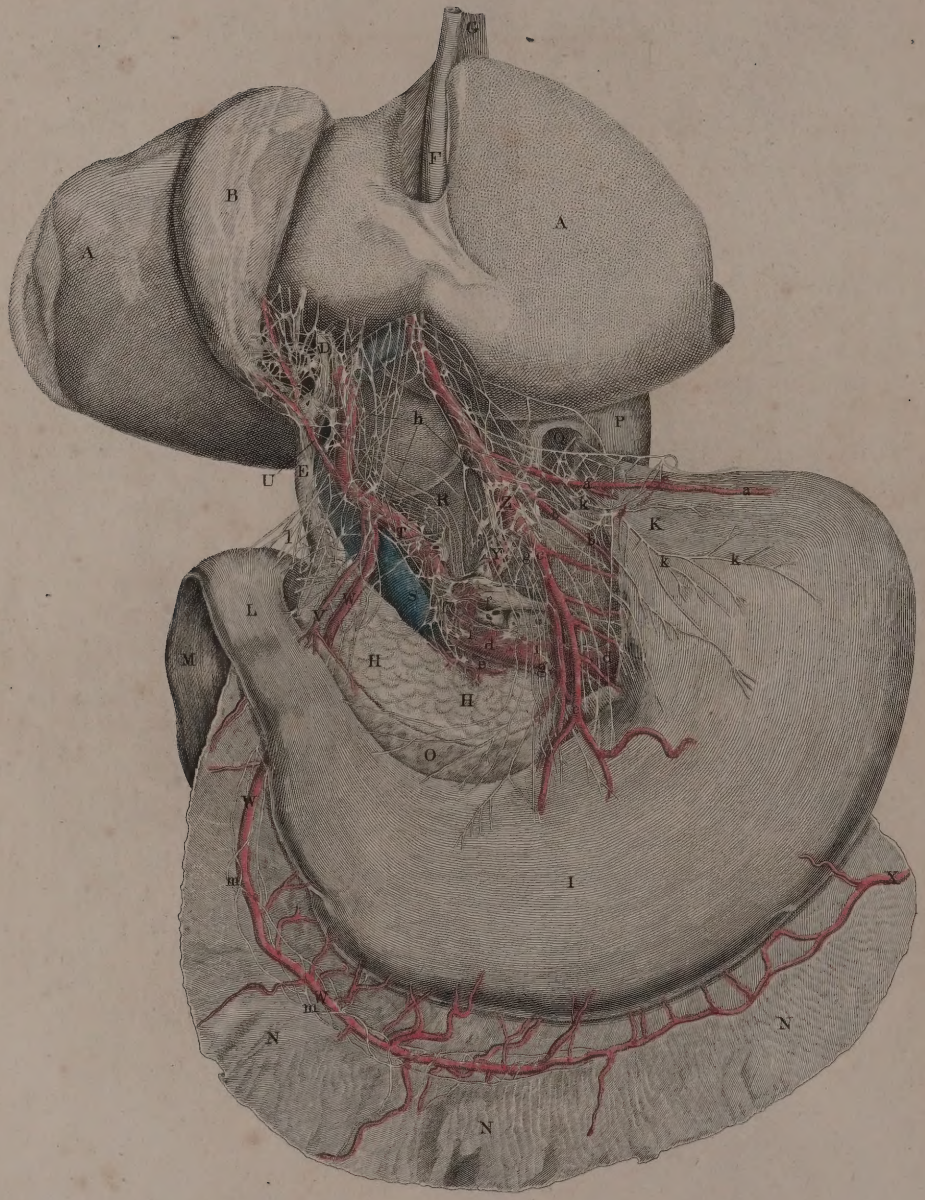

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PLATE X.

This exhibits the Nerves of the Liver and Stomach from the Solar Plexus, which could not be so well expressed in the preceding Plates.

A, A. The liver.
B. The gall-bladder.
C. Cystic duct.
D. Hepatic duct.
E. Ductus communis choledochus.
F. Round ligament of the liver.
G. Broad ligament.
H. H. The pancreas.
I. The stomach.
K. Cardiac extremity of the stomach.
L. Pylorus.
M. Duodenum.
N, N, N. A portion of the large omentum.
O. A portion of the small omentum.
P. Part of the diaphragm.
Q. Opening of the diaphragm for the passage of the oesophagus.
R. Vena cava.
S. Trunk of the vena portæ.
T. Right hepatic artery.
U. Cystic artery.
V. Pyloric artery.
W, W, W. Right gastro-epiploic artery.
X. Cut trunk of the left gastro-epiploic artery.
Y. Common trunk of the left hepatic artery and the coronaria ventriculi, surrounded by nerves and ganglions.
Z. Left hepatic artery.
a, a. Cardiac artery from the left hepatic.
b, b. Branch from the left hepatic artery to the stomach.
c, c, c. The coronaria ventriculi.
d, d. The splenic artery.
e. Pancreatic artery.
f, f. Coeliac plexus.
g, g. Coronary plexus of the stomach.
h. Hepatic plexus.
i, i. Splenic plexus.
k, k, k. Branches of the pneumo-gastric nerve.
l. Branches from the hepatic plexus to the duodenum.
m, m. Gastro-epiploic nerves from the hepatic plexus.

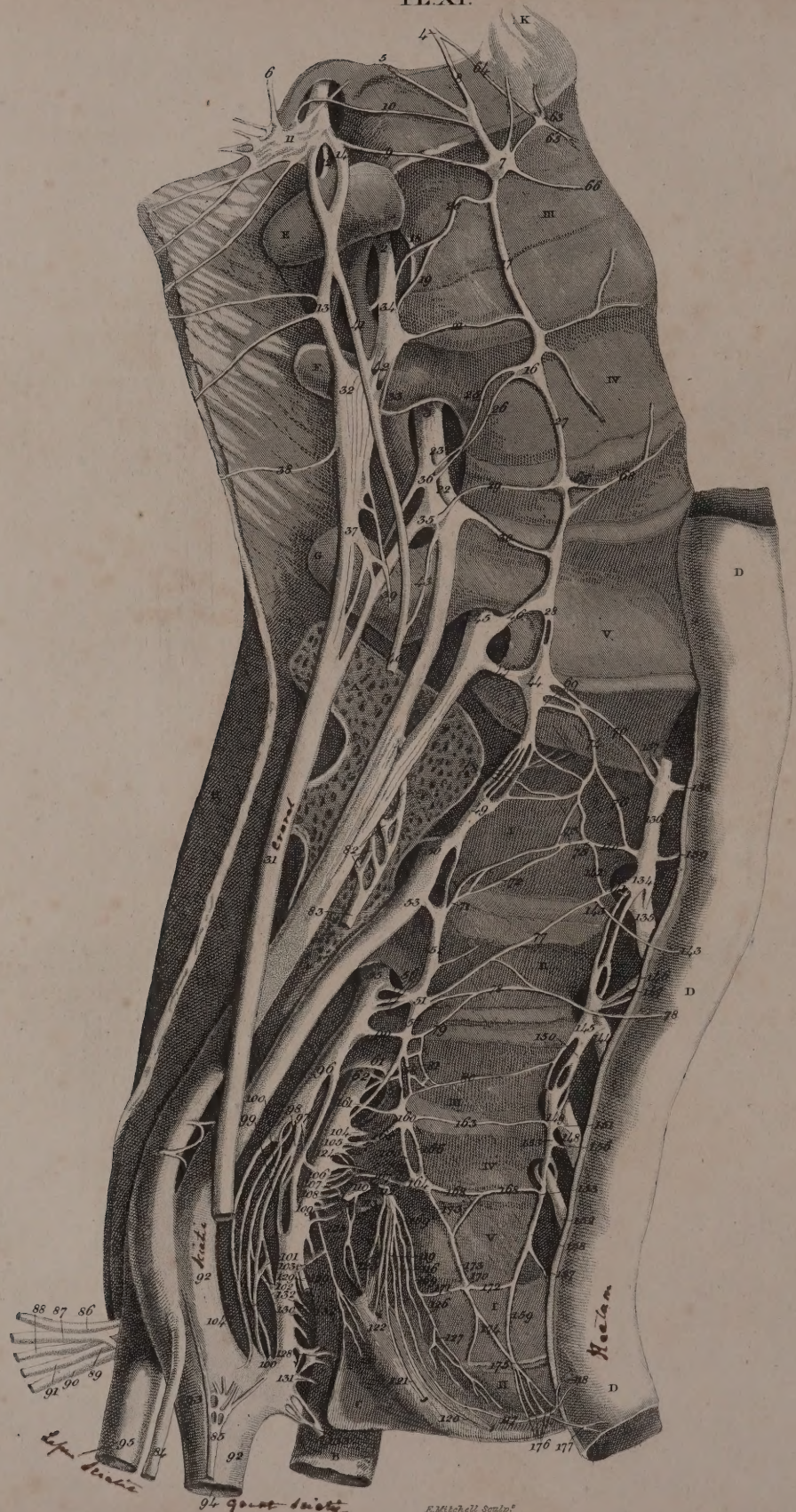
PLATE X.

This exhibits the Nerves of the Liver and Stomach from the Solar Plexus, which could not be so well expressed in the preceding Plates.

A. A. The liver.
B. The gall-bladder.
C. Cystic duct.
D. Hepatic duct.
E. Ductus communis choledochus.
F. Ramal ligament of the liver.
G. Round ligament.
H. H. The pancreas.
I. The stomach.
K. Cardiac extremity of the stomach.
L. Pylorus.
M. Duodenum.
N, N, N. A portion of the large omentum.
O. A portion of the small omentum.
P. Part of the diaphragm.
Q. Opening of the diaphragm for the passage of the oesophagus.
R. Vena cava.
S. Trunk of the vena porta.
T. Right hepatic artery.
U. Cystic artery.
V. Pyloric artery.

W, W, W. Right gastro-epiploic artery.
X. Cut trunk of the left gastro-epiploic artery.
Y. Common trunk of the left hepatic artery and the coronalis ventriculi, surrounded by nerves and ganglions.
Z. Left hepatic artery.
a, a. Cardiac artery from the left hepatic.
b, b. Branch from the left hepatic artery to the stomach.
c, c, c. The coronalis ventriculi.
d, d. The splenic artery.
e. The vena porta.
f, f. Cystic plexus.
g, g. Coronary plexus of the stomach.
h. Hepatic plexus.
i, i. Splenic plexus.
k, k, k. Branches of the pneumo-gastric nerve.
l. Branches from the hepatic plexus to the diaphragm.
m, m. Gastro-epiploic nerves from the hepatic plexus.

PL. XI.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I
II
III
IV
V
D
Brand
Radial
Radial
Ulnar
Ulnar
E. Mitchell Sculp.

PLATE XI.

Showing the Origin and Connexion of the Lumbar and Sacral Nerves, the free Communication and frequent Anastomosis of the great Sympathetic of the Right with that of the Left Side, and its ultimate Termination.*—WALTER, *Tab. Nerv. Thor. et Abdom. Tab. I. Fig.* 2.

III, IV, V—Third, fourth, and fifth lumbar vertebrae.
I, II, III, IV, V—Five false vertebrae of the os sacrum.
I, II—Os coccygis.
A—Part of the first and second vertebrae of the os sacrum sawn laterally to expose the foramina by which the first and second sacral nerves emerge.
B—Portion of the posterior sacro-sciatic ligament.
C—Anterior sacro-sciatic ligament.
D, D, D—Rectum cut near the sphinter muscle.
E—Transverse processes of the third,
F—Fourth, and,
G—Fifth lumbar vertebrae.
H—Skin of the haunch and perinaeum.
K—External and middle crus of the diaphragm.
1. Anterior branch of the second,
2. Third, and,
3. Fourth lumbar nerves.
4. Portion of the second lumbar ganglion.
5. Filament originating from the anastomosing branch between the first lumbar nerve and the singular ganglion of the second lumbar nerve.
6. Anastomosis of the first lumbar nerve with the peculiar ganglion of the second lumbar nerve.
7. Third lumbar ganglion.
8. Trunk of the great sympathetic, or anastomosing branch, between the second and third lumbar ganglia.
9. A twig which the second lumbar nerve sends to the ganglion 98.
   Instead of this single branch, there are occasionally two proceeding to the same ganglion.
10. Anastomosing branch between the singular ganglion of the second lumbar nerve and the trunk of the great sympathetic.
11. Singular ganglion of the second lumbar nerve 26.
12. Posterior branch of the second lumbar nerve running to the dorsal muscles.
13. Anastomosis between the second and third lumbar nerves.
14. Superior root arising from the lumbar nerve 26.
15. Inferior branch from the ganglion of the lumbar nerve by which anastomosis 13, is composed.
16. Fourth lumbar ganglion.
17. Trunk of the great sympathetic, or communicating branch between the third 2, and fourth 3, lumbar nerves.
18, 19. Two branches uniting into
20. A single twig, by which the trunk of the sympathetic 17, is joined to the lumbar nerve 2.
21. Branch of the nerve 2, communicating with the trunk of the nerve 17.
22, 23. Two anastomosing twigs of nerve 3, uniting midway into
24. An intermediate ganglion, and again dividing into
25, 26. Two branches, to unite with the fourth lumbar ganglion 16.
27, 28. Trunk of the great sympathetic, or communicating branch between the fourth and fifth lumbar ganglia.
29. First anastomosing branch.
30. Second communicating branch of the nerve 3, with 27 and 28.
31. Crural nerve.
32. The origin, or first root of the crural nerve from the anastomosis between the second and third lumbar nerves 13.
33. The commencement, or second thick root of

* Unwilling to interfere with the original plate of WALTER—FISCHER, from whose work this plate is taken, has superadded, in the form of notes to the general text, those variations in the origin and distributions of these nerves which he has met with in prosecuting the dissection of the same parts.

the crural nerve from the anterior branch of the third lumbar nerve 2.

34. Posterior branch of the third lumbar nerve.
35. Origin, or third root of the crural nerve from the fourth lumbar nerve.
36. Posterior twig of the fourth lumbar nerve.
37. Anastomosis between the second and third roots of the crural nerve.
38, 39. Cutaneous branches of the crural nerve.
40. Obturator nerve.
41. Origin, or first root of the obturator nerve, from the nerve 13.
42. Second root of the obturator nerve, composed of three branches from the third lumbar nerve 2.
43. Third root from the fourth pair of lumbar nerves.
44. Fifth lumbar ganglion.
45. Anterior branch of the fifth pair of lumbar nerves.
46. Communicating branch of the fifth lumbar nerve 45, with the trunk of the sympathetic 28.
47. Twig of the fifth lumbar nerve proceeding to the fifth lumbar ganglion.
48. Four anastomosing nerves arising from the last lumbar ganglion, which, uniting into one, form the
49. First communicating branch with the first sacral nerve 50.

The twigs 48, perform on the right side the function of the trunk of the sympathetic, and must be considered as the first sacral ganglion.

50. Anterior branch of the first sacral nerve.
51. Second sacral ganglion.
52. Trunk of the sympathetic or anastomosing branch between the first and second sacral ganglia.
53. Second thick root of the first sacral nerve communicating with the trunk of the sympathetic 52.
54. Anastomosis between the first, 49, and second root of the first sacral nerve.
55. Second right sacral nerve.
56. Three branches arising from the second sacral nerve, and proceeding to the second sacral ganglion, 51.
57. Trunk of the great sympathetic or communicating branch between the second sacral ganglion, 51, and the third right sacral ganglion 160.
58. Internal branch of nerve 57.
59. External branch of nerve 57.
60. Root of the second sacral nerve communicating with the nerve 57.
61. First branch of the third sacral nerve anastomosing with the nerve 58.
62. Third sacral nerve of the right side.
63. Second accessory lumbar ganglion.
64. Communication of the second lumbar accessory ganglion with the great sympathetic.
65. Hypogastric branch of the second accessory lumbar ganglion.
66. Hypogastric branch of the third lumbar ganglion, (7.)

Besides this nerve we have observed another arising from this ganglion. These accessory ganglia are not always to be found.

67. Branches arising from the great sympathetic nerve 27, 28, and composing the
68. Communicating nerve, when the sympathetic of the right side sends to that of the left, between the fourth and fifth lumbar vertebrae, and behind the iliac arteries.

This communication is not always present.

69. Twigs from the fifth lumbar ganglion uniting into
70. A single anastomosing branch with the trunk of the sympathetic of the left side, and which is joined by an elegant anastomosis with the trunk of the sympathetic of the right side.
71. Anastomostic branch of nerve 53, which, dividing into
72. Two branches, is afterwards joined into one, by which the
73. Two anastomoses, with the nerve 74, are established.
75. Remainder of the trunk of nerve 72, inserted into the first sacral ganglion of the left side.
76. A branch arising from nerve 74, and communicating with the first sacral ganglion of the left side.
77. A communicating nerve with the first sacral ganglion of the left side, which the ganglion 51 sends off.
78, 78. Twig of the second sacral ganglion 51, proceeding to that surface of the rectum lying upon the sacrum.
79. Filament arising from nerve 57, and inserted into nerve 78.
80. A branch springing from nerve 58, and uniting with the trunk of the sympathetic of the left side.

81. Communication between nerves 79 and 80.
82. Branches of the fourth and fifth lumbar nerves uniting to form a
83. Muscular branch running to the glutæus medius, and especially to the glutæus minimus and tensor vaginæ femoris.
84. Inferior gluteal cutaneous nerve, which descends as far as the middle of the leg.
85. A muscular filament giving its branches to the gemellus superior and inferior, obturator internus, and quadratus femoris muscles.
86, 87, 88. Twigs to the glutæus maximus.
89. Trunk of the inferior cutaneous nerve of the haunches, dividing into two branches.
90. Superior branch of the inferior cutaneous nerve of the haunches, which, after giving many twigs to the skin of that region, terminates upon the skin where the glutæus maximus is inserted into the bone.
91. Inferior branch of the same nerve 89, terminating nearly in the same manner as the preceding, after sending off many filaments.

It sometimes happens that the nerve 89 divides a little lower down than this.

92, 92, 93. Trunk, or plexus, so called, of the great sciatic nerve, formed by the union of the fourth and fifth lumbar, and first, second, and third sacral nerves.
94. Great branch of the sciatic nerve.
95. Small branch of the sciatic nerve.
96. The first anastomosis between the second and third sacral nerves.
97. Second anastomosis between the same nerves.
98. Third anastomosis between the second and third sacral nerves.
99. First branch which the sciatic nerve receives from the second sacral nerve.
100, 100. Middle cutaneous nerve of the haunches originating from the second branch of the sciatic nerve, and ending in the middle of the skin of the haunches.
101. Twig from the nerve 99, uniting with a
102. Filament coming from nerve 100, to constitute
103. The superior cutaneous nerve of the hips, which terminates in the skin covering the gluteal muscles.
104. First hypogastric branch, which the third pair of sacral nerves sends to form the hypogastric plexus, from which the nerves of the bladder of urine, vagina, uterus, and rectum originate.
105. Third hypogastric branch.
106, 107, 108. Sixth, seventh, and eighth hypogastric branches.
109. Ninth and tenth hypogastric branches.

The number of these nerves, forming the hypogastric plexus, is subject to the greatest variety; we sometimes find many of them, sometimes very few.

110. Fourth sacral nerve of the right side.
111. The uterine nerve proceeding with the uterine artery to the uterus.
112. Trunk of the fourth sacral nerve, from which not only three perforating nerves originate, but likewise communicating filaments with the fourth sacral ganglion, and with the fifth or last sacral nerve.
113. Common trunk of the second and third perforating nerves, 114, 115.
116. Internal branch of the first perforating nerve, or external hæmorrhoidal nerve. From which arises
117. 118. A twig terminating in the rectum.
119. 120. External twig of the first perforating nerve.
114. Second perforating branch, dividing immediately into two filaments. One of which,
121. A cutaneous branch, perforates the interspinal ligament, and terminates in the skin of the coccyx. The other
122, Is a musculo-ligamentous branch, ending in the interspinal ligament.
115, Third perforating nerve, concluding a little externally and superiorly in the skin of the coccyx, after giving off
123, A muscular twig, which terminates in the longissimus dorsi, and sacro-lumbalis and coccygeal muscles.
124. First branch of the fourth perforating nerve, arising from the third sacral.
125. Second twig of the perforating nerve, originating from the fourth sacral.
126. Trunk of the fifth sacral nerve.
127. Branches of the fifth sacral nerve, ending in the interspinal ligament and sacro-lumbalis, and longissimus dorsi muscles.
128. Superior pudic nerve.
129. Trunk of the internal hemorrhoidal nerve, originating from the third sacral, and dividing into three filaments.
130. Pudic nerves.
130, 131. Occasionally the nerve 130 joins with

the nerve 131, and sends its branches to the extremity of the labia pudendi.

These nerves are liable to the greatest variety in their origin.

132. A branch which is sent to the lateral parts of the skin of the haunches, near the vagina.

133. Inferior or long pudic nerve, arising by three roots from the origin of the great sciatic nerve.

134. Ganglion of the first sacral nerve of the left side.

135. First left sacral nerve.

136. Trunk of the left sympathetic, or communicating nerve between the first sacral ganglion and the fifth left lumbar ganglion.

137, 138, 139. Filaments which the sympathetic sends to the hypogastric arteries.

140. Anastomosis of the first left lumber ganglion with nerve 71 of the right side; hence the first sacral ganglion of the left side communicates with the second branch of the first sacral nerve of the right side performing the function of the first sacral ganglion, through the medium of the nerves 71, 72, 75.

141. Anastomosis of the first sacral ganglion of the left side with branch 77 from the second sacral ganglion of the right side.

142. Communication between nerves 8 and 7.

143. 143. Twig of nerve 8 running to the rectum.

144. Second sacral nerve of the left side.

145. Second left sacral ganglion.

146. Trunk of the sympathetic or anastomosing nerve between the first 134 and second 145 sacral ganglion of the left side.

147. Nervous twigs of the second sacral ganglion proceeding to the branches of the hypogastric artery.

148. Third sacral nerve of the left side.

149. Third left sacral ganglion.

150. Trunk of the left sympathetic or communicating nerve between the third and second left sacral ganglion.

151. Twig of the third sacral ganglion 149, uniting with the trunk of the third sacral nerve, 148 of the left side.

152. Fourth left sacral nerve.

153. Fourth sacral ganglion of the left side.

154. Trunk of the sympathetic, or anastomosing nerve, between the fourth and third sacral ganglia of the left side.

155. Communicating twig of the left sympathetic, with the third sacral nerve of the left side.

156. Anastomosing filament of the trunk of the left sympathetic with the fourth, left sacral nerve, 152.

157. Fifth sacral nerve of the left side.

158. Trunk of the left sympathetic, or communicating nerve between the fourth left sacral ganglion and the fifth left sacral nerve.

159. Termination and union of the great sympathetic nerve of the left side with that of the right.

160. Third right sacral ganglion.

161. 162. Branches which the third sacral ganglion receives from the trunk of the third sacral nerve, 62.

163. Anastomosis of the third sacral ganglion of the right side, with the third sacral ganglion 149 of the left.

164. Fourth right sacral ganglion.

165, 166. Trunk of the right sympathetic or communicating nerve between the third and fourth sacral ganglia.

167. Filament of the fourth sacral ganglion of the right side, which it receives from the third right sacral nerve 62.

171. Communicating filament.

The fifth sacral ganglion of the sympathetic is frequently so small, that it hardly merits the name of ganglion.

172. A communicating filament which the same ganglion on the left side receives from the sacral nerve 157.

168. 168. Anastomosis between the right and left fourth sacral ganglia.

169. 169. Communication of nerve 112 with the fifth sacral nerve of the right side.

170. Fifth sacral ganglion of the sympathetic, a single ganglion, to which in the right side the fifth sacral nerve sends a

173, 173. Trunk of the right sympathetic or anastomosing nerve between the fourth and fifth single sacral ganglia.

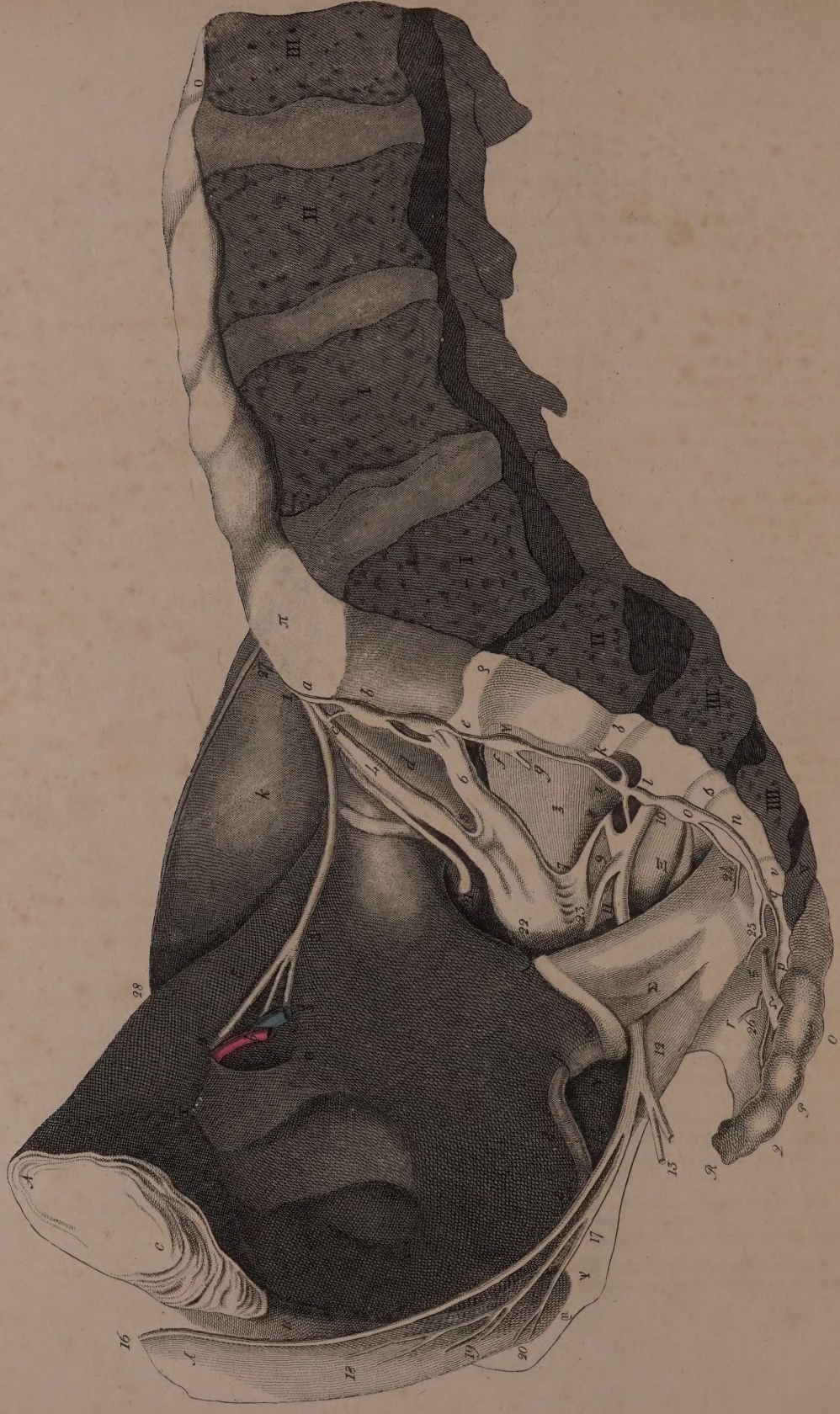
174. Final termination of the right sympathetic.

175. Coccygeal ganglion, in which the right and left sympathetics are united.

176. The last branches which the ganglion 64 sends off, and which by very minute filaments end in the extremity of the posterior coccygeal ligament.

177. A twig implanted into the termination of the intestinum rectum.

PL. XII.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Origins of the Great Sciatic Nerve, and its Connection with the Sympathetic.

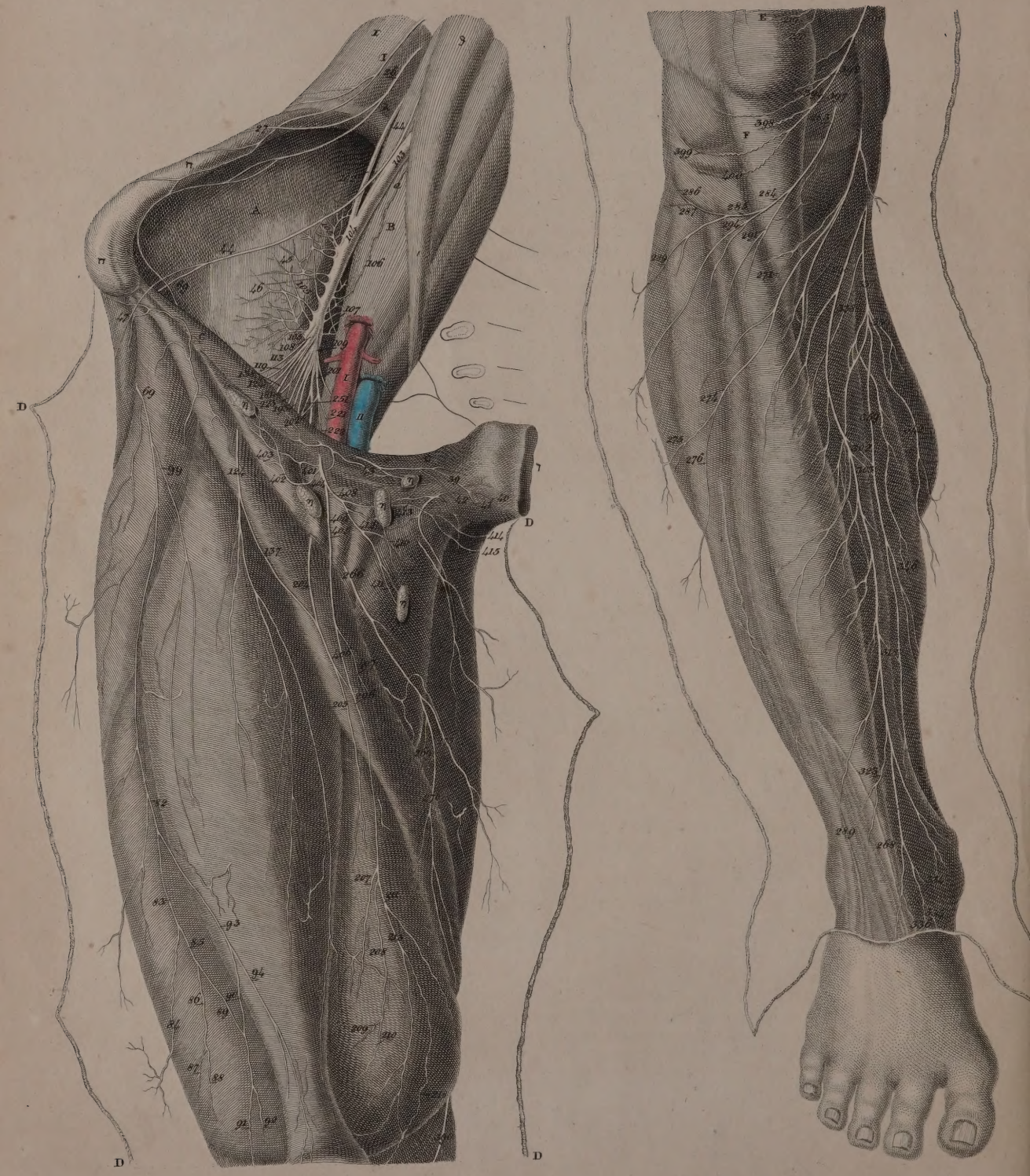
Demonstrat. Anatom. Patholog. Lib. ii.—CAMPER.

I. II. III. Three last lumbar vertebrae.
I. II. III. IV. V. The five false vertebrae composing the sacrum, cut perpendicular.
A, B—Commissure of the bones of the pubis.
A, C—Pulpy part of the cartilage of the symphis of the pubis.
B, C—Ligamentous portion of the same.
O, P, Q, R—The four small bones of the coccyx.
ϒ, Δ, Θ—Thyroid ligament.
2, Θ—Semilunar opening for the passage of the obturator vessels.
Λ, Ξ, Σ, P—Short, or internal ligament of the sacrum.
Ψ, Ξ, P—Long, or external ligament of the sacrum.
Ω, ς—Ligament of the coccyx.
α, β, γ, δ, ε—Surface of the os ischii encrusted with cartilage, upon which the tendon of the obturator internus moves as on a pulley.
β, γ, δ—Cartilaginous eminences.
η—Union of the bones of the sacrum with the os innominatum.
Θ—Obturator vein.
b, 2.—Obturatrix artery.
κ—Psoas muscle.
λ, μ—Erector of the penis.
ν, ξ, Ξ—Pyriform muscle.
ο, π—Long anterior ligament of the vertebrae.
ρ, σ, τ, υ—Divisions between the false bones of the sacrum.
1, 2, 3. Obturator nerve.
4, 5. First sciatic branch formed by two lumbar nerves.
6, 5, 7. Second sciatic branch arising from the first sacral.
8, 7, 11. Third branch of the sciatic nerve springing from the third sacral.
9—1. A remarkable branch from the same sacral, which is joined to the pudic nerve.
10, 9 Third sacral nerve, which, united with the second, is added to the sciatic, 9, 23.
4, 21. Branch proceeding from the lumbar nerves to the gluteal muscles.
22, 23. Sciatic nerve and its plexus between 4, 5, 6, 7, 8, and 9.
24. Fourth sacral nerve.
25. Fifth sacral nerve.
26. Sixth sacral nerve, or coccygeal.
27, 28. Inguinal nerve running to the inguinal glands and cremaster muscle.
11, 12. Pudic nerve proceeding under the sacro-sciatic ligament, and sending a
12, 13. Remarkable branch to the anus and its muscles.
14, 15, 16. Pudic nerve sending branches to the erector penis, transversalis perinaci, and perinaeum itself.
19. Inferior pudic branch cut.
a, *b*—Trunk of the intercostal nerve coming from the loins and forming
b—A ganglion.
c—Branch from the last lumbar nerves joined to the ganglion *b*.
d—Branch from the first sacral nerve.
6—Another branch arising from the same sacral, and united to the second ganglion.
e—Second ganglion.
f—Third ganglion, which acquires
h, *f*, & *g*, *f*—Two branches from the second sacral.
f, 1—Intercostal nerve becoming smaller, and acquiring
k, *l*—A small branch from the second sacral, and
m, *l*—Another from the third sacral; whence
l, *o*—A double ganglion, to which a remarkable branch from the
24, 0. Fourth sacral nerve is added.
0, *n*, 9. Intercostal nerve, united with a branch from the fifth sacral 25.
p. 9, 26. Termination of the intercostal nerve, beyond which we cannot trace it. However, it derives a remarkable branch from the coccygeal, 26.
1, 26. Sixth sacral or coccygeal nerve, distributing its branches to the coccygeal muscle and neighbouring parts.*

* FISHER, aware of the excellence of the original, and of the impossibility of rendering, by any new dissection of his own, the origins of the great sciatic nerve and their connexion with the sympathetic either more simple or more accurate, acknowledges having copied this Plate from CAMPER.

A section of the pelvis, sacrum, and lumbar vertebrae has been made. The sciatic plexus and its anastomosis with the sympathetic, the termination of the sympathetic and commencement of the great sciatic nerve, are exposed on the right side.

PL. XIII.



E. Mitchell sculp.

PLATE XIII.

This Figure, taken from the male subject, shows the right thigh, leg, and foot, besides some nerves and muscles situated in the pelvis, and also some superficial cutaneous and subcutaneous nerves and blood-vessels, such as meet the eye when the skin and fat has been laid back and removed carefully from above the fascia lata. But since the small size of the nerves, and the extremely minute distribution of their branches in this greatly diminished representation of the foot, cannot be represented even by the most excellent artist, for this reason we have attempted to depict these nerves somewhat larger and thicker than they exist in nature, persuaded, that, from this circumstance, no irreparable loss will accrue to the studious in anatomy; but we have taken especial care that the situation of the nerves should be preserved as far as is possible.

A. Iliacus internus.
B. Psoas magnus.
ϑ. Psoas parvus.
ι. Its tendon.
κ. The quadratus lumborum muscle, cut off.
λ. Its origin from the crest of the ileum.
CC. Ligament of Fallopius.
DDDD. The skin laid back.
E. Patella.
F. Its ligament inserted into the tibia.
η. η. η. Inguinal glands.
ד. Syncondrosis of the bones of the pubis.
ת. Margin or crest of the ileum.
I. Crural artery.
II. Crural vein.
I. Branch of the first lumbar nerve.
26. Twig of the second lumbar nerve, which divides into
27. One twig going to the back part of the thigh and of which Fig. 2. n. 28, 29, 30, 31. represents the ultimate branches.
39. Branch of the same nerve, which
40, 41.* Terminates by two filaments in the skin and fat of the mons veneris and in the scrotum.
42. A twig which terminates in the skin near the scrotum.
43. A very small branch going to an inguinal gland.
44. External cutaneous nerve.
46. Branch anastomosing with the crural nerve, (104.)
45. A very minute filament of this branch anastomosing with a branch of the iliac plexus, (105.)
47. Posterior branch of the external cutaneous nerve, (44.) going to the anterior and external part of the thigh, the progress of which branch, Fig. 2. n. 48, 49, 50, ,51 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, shows
69, 69. Anterior branch of the external cutaneous nerve, (44.) going to the anterior and external part of the thigh.
82. The anterior continuous branch of the external cutaneous nerve, (44.) which now divides into two equal twigs.
83. One which constitutes the fifth twig of the anterior branch of the external cutaneous nerve, and ends in

* It is presumed that Mr. Fischer means that these nerves go in the female to the Mons Veneris, and in the male subject to the corresponding part of the body and to the Scrotum.

84. A cutaneous branch terminated by two filaments, and in
85. A subcutaneous branch, which
86. Gives off a small nervous twig,
87, 88. Dividing into two filaments,
89. One by anastomosing joins with a small twig, and
91, 92. Ends by two filaments in the skin, covering the exterior of the knee. This ends
93. In another, which constitutes the sixth twig of the anterior branch of the external cutaneous nerve.
90, and 94. Another twig, which terminates in
99. The seventh twig of the anterior branch of the external cutaneous nerve (44.)
102. The root of the crural nerve, derived from the second and third lumbar nerves.
103. Root of the crural nerve, derived from the fourth lumbar nerve.
104. The nerve termed the crural, or great, or anterior femoral.
105, 105, 105. Nervous twigs arising from the crural nerve which form the delicate iliac plexus covering the iliacus internus muscle.
106. Recurrent nerve of the psoas magnus.
107. Nervous twigs distributed to the psoas muscle.
108. Musculo-cutaneous trunk arising from the crural nerve, which gives off various nerves, namely, the nerve for the pectineus muscle 109, three nerves for the sartorius muscle 113, 119, 195. Middle cutaneous nerve 124 gives four nerves to the vastus externus muscle 113, 146, 153, 165, and a short or superior nerve for the crural muscle.
109. Nerve for the pectineus muscle, the distribution of which in Fig. I. Tab. 4, n. 110, 111, can be seen.
113. Superior or short nerve for the sartorius muscle, the branches of which can be seen in Tab. III. Fig. 1, and Tab. IV. Fig. 1, 114, 115, 116, 117, 118.
119. Middle nerve for the sartorius muscle. The ultimate branches of this nerve can be distinctly seen in Tab. III. Fig. 1, and Tab. IV. Fig. 1, under the numbers of 120, 121, 122, 123.
124, 124. Middle cutaneous nerve.
137. Fourth small branch of the nerve 124, which anastomoses with the anterior cutaneous nerve 204.
138. Nervous branch, from which the nerves distributed to the vastus externus muscle, and the short or superior nerve of the crural muscle, arise. Tab. III. Fig. 1, represents in a partial manner the descent and distribution of these nerves, but Tab. IV. Fig. 1, represents perfectly these nerves, from the numbers 139, 140, to the number 180.
181. Branch arising from the crural nerve, which is distributed to the rectus muscle of the leg, the terminating branches of which appear partly from Tab. III. Fig. 1, partly from Tab. IV. Fig. 1, n. 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194.
201. Branch from which the nerve distributed to the crural artery, and to the short adductor muscle of Albinus, takes its origin.
202. Anastamosing twig arising from the preceding branch, to compose the anterior cutaneous nerve 204. Another anastamosing twig 203, represented in Tab. IV. Fig. 1, is also perceived.
204. Anterior cutaneous nerve.
205. First small branch of the nerve 204, which terminates by two twigs in the skin.
206. Anterior continued cutaneous nerve.
207. Second small branch of the nerve 204, which terminates
208. By two twigs in the skin.
208. Third small branch of the nerve 204, which
209, 210. Terminates by two filaments in the fat.
211. Continued anterior cutaneous nerve, 204.
213. Continued anterior cutaneous nerve 204.
218. Termination of the anterior cutaneous nerve.
219, 220. Disappearing by two twigs in the cellular texture uniting the superior margin of the patella with the skin.
221. Nervous branch going to the crural artery by two or three filaments, and terminating in its muscular coat.
222. Nerve which, proceeding to the short adductor muscle of Albinus, and there by anastamoses joins with the anterior branch of the obturator nerve, which enters the same muscle.
223. Long nerve of the crural muscle, the branches of which can be seen in Tab. IV. Fig. 1, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244. Beyond this nerve arises the short or superior nerve 245, which is delineated in the same table and figure under the numbers 246, 247, 248, 249, 250.
251. Root of the long or inferior nerve distri-

buted to the vastus internus muscle and saphenus nerve; the terminating branches of the former nerve are shown in Tab. IV. Fig. 1, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, but the descending of the posterior branch towards the knee is shown in the same table and figure under the numbers 266, 267, 268, 269, 270; but the terminating branches of this saphenus nerve, represented in our table, will be found in the following manner, viz. the

269. remarkable slip of the 1st branch of the saphenus nerve 266, which immediately divides into three or four small branches 270, 271, 272, 273, 274, 277, will be found Tab. IV. Fig. 1; the

271. Small branch of the branch 269, which terminates by one twig in cellular texture near the ligament of the patella, and by

275. Another which enters

276. The skin covering the anterior and external surface of the tibia in Tab. IV. Fig. 1.

274. Continued small branch, 271.

283. Remarkable continuation of the second branch of the saphenus nerve 266, which immediately terminates in three small branches 284, 291, and 294.

284. Small branch of the branch 283, which

285. Meets towards the knee by one twig and in its external side is inserted

286, 287. By two filaments into the capsular ligament.

297. Continuous saphenus nerve, Tab. IV. Fig. 1, 297.

298. Continuous saphenus nerve.

323. 11th branch of the saphenus nerve, which proceeds to the malleolus externus, and 12th branch of the saphenus nerve, going to the malleolus internus.

334. 14th branch of the saphenus nerve.

335. 15th branch of the saphenus nerve.

336. 16th branch of the saphenus nerve; which said three branches partly terminate below the malleolus internus in the adipose membrane of the skin, and partly in the skin itself.

337. 17th branch of the saphenus nerve, more singular than the rest, therefore it is customary to designate this branch by the name of the Lesser Saphenus Nerve, or Second. It proceeds along with the trunk of the saphenus nerve, with which, in its progress, it is joined in a threefold manner, by anastomosis, 302, 303, 318, towards the malleolus internus, and there terminates in the lateral and opposite part of the leg.

338. First small branch of this branch, almost the largest, passing over the tibia, and terminating in the skin, situated in the middle portion of the tibialis anticus muscle.

339. Small knot, or ganglion, which the lesser saphenus nerve forms to give of the various branches.

342. Filament given off to the skin during the progress.

346. A twig.

359. Continuous lesser saphenus nerve, 337.

390. Fifth branch of the internal cutaneous nerve.

394. Continuous small branch, 392.

397. Continuous 5th branch, 390.

398. Small branch distributed to the ligament of the patella.

399. Small branch which tends towards the exterior parts of the knee.

400. In the fat.

401. A slip of the inguinal nerve.

402. A branch obliquely ascending to an inguinal gland towards the superficial parts.

403. A small branch terminating in the fat.

404. Small branch descending to the inguinal gland.

405. Inguinal nerve continued.

406. Anastomosing branch which connects the anterior cutaneous nerve, 204, with ours.

407. Termination of this inguinal nerve in the fat.

408. Branch which terminates in three twigs.

409. 1st twig descends to the inguinal gland, during which course

410. It gives off a lateral filament to the fat,

411. And then enters the inguinal gland by two filaments.

412. Second twig proceeds to the inguinal gland.

413. The third twig is the external pudic nerve which bifurcating

414, 415. Proceeds by two filaments to the scrotum below the mons veneris,* and is distributed in a different manner to the skin and fat.

268. Internal branch of the superficial peroneal nerve meeting the view under the fascia lata.

289. External branch of the superficial peroneal nerve appearing under the fascia lata.

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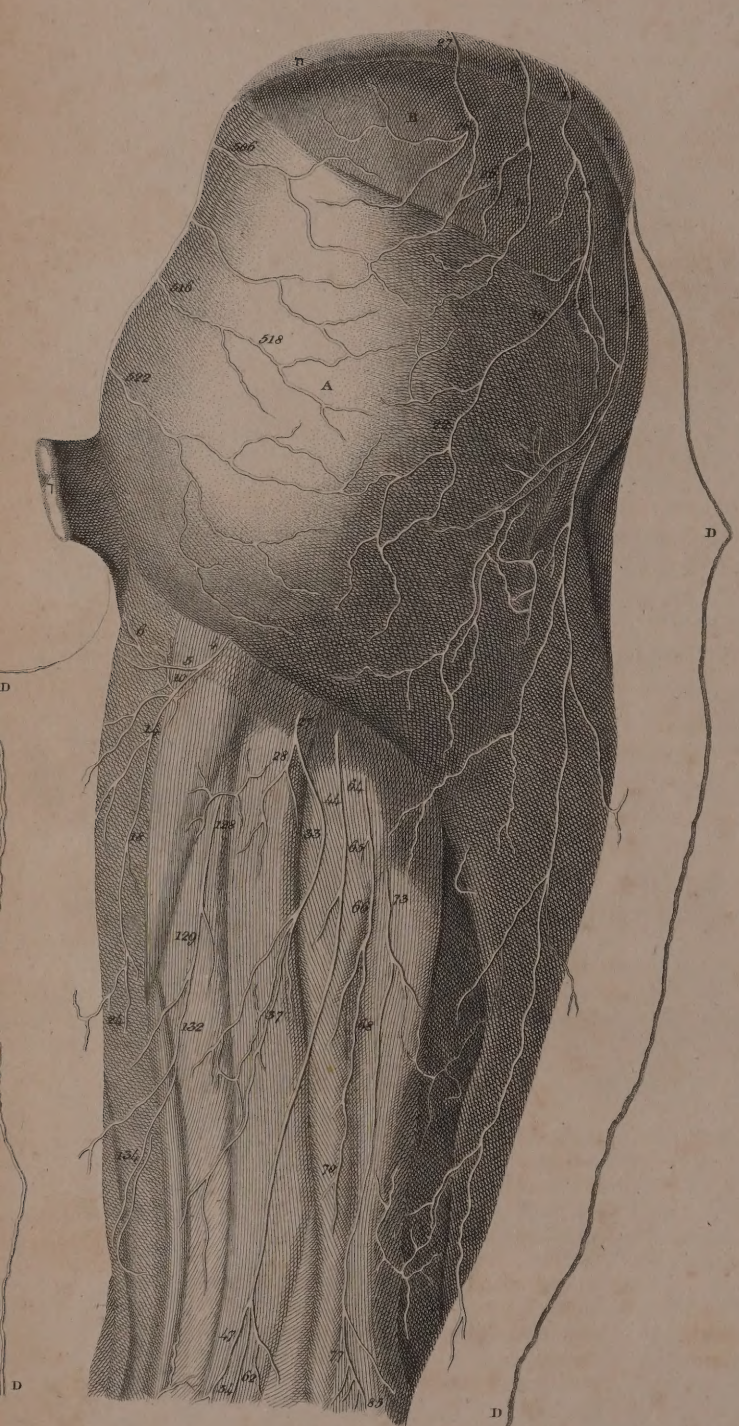
* See previous note to 40. 41.

PL. XIV.



E. Mitchell sculp.

PLATE XIV.

This Plate represents those cutaneous and subcutaneous nerves and blood-vessels which meet the view above the fascia lata on the opposite side of the thigh when the common integuments and fat have been carefully removed, by reason of the extreme fineness of these nerves, the natural position and size of each cannot always be depicted, so as to satisfy the expectation of those most skilled in dissection. Since affairs are thus, we have the more studiously enlarged every nerve, so that in making this table, we may not overlook their natural situation. It therefore happens that more nerves should come into view when they have perforated the fascia lata. But we have abstained from the delineation of those cutaneous nerves on the sole of the foot, by reason of their extreme minuteness, and the small size of this table, in the same manner as in the preceding figure, we have left untouched the cutaneous nerves on the dorsum of the foot.

A. Gluteus magnus muscle.
B. Gluteus medius muscle.
C, C. Gastrocnemic muscles covered by the fascia lata.
D, D, D, D. A flap of skin.
ח. The margin or crest of the ilium.
ז. The os-pubis and its syncondrosis.
6. Small branch of the first lumbar nerve. For the origin of this nerve see Fig. 1, n. 1, 2, 3, 4, 5.
10. Continuous small branch, 6.
13. Another small branch of the same first lumbar nerve.
15. Continued small branch, 13.
17. Small branch continued, 13.
19. Continued small branch, 13, going towards the middle part of the gluteus maximus muscle.
22. Continued small branch, 13.
27. Small branch of the second lumbar nerve, see Fig. 1, n. 25, 26, 27.
28. Continued small branch, 27, now bifurcating.
47. Posterior branch of the external cutaneous nerve, 44.
50. *Continued small branch*, 48.
52. *Continued small branch*, 48.
53. *Continued small branch*, 48.
57. Continued branch, 47.
62. Branch continued, 47.
65. Continued branch, 47.
4. Superior lateral branch of the posterior cutaneous nerve, Tab. iv. Fig. 2, n. 1, 2, 3, shews the descent and junction of this nerve.
6. Small branch continued, 5.

10. Continued branch, 4.
14. Continued branch, 4.
18. Continued branch, 4.
24. Termination of the branch, 4.
27. Second lateral branch of the posterior superior cutaneous nerve, Tab. iv. Fig. 2, n. 25.
26, 27. Represents the origin and anastamosis of this nerve.
33. Branch continued, 27.
37. Continued branch, 27.
44. Third lateral branch of the posterior superior cutaneous nerve, perforating the fascia lata, Tab. iv. Fig. 2, under the numbers of 42, 43, 44, shows the origin and connexion of this nerve.
54. Continued nerve.
64. Fourth lateral branch of the posterior superior cutaneous nerve, penetrating the fascia lata. For the origin of this nerve, see Tab. iv. Fig. 2, n. 64.
66. Continued branch, 64.
68. Continued branch, 64.
70. Termination of branch, 64, bifurcating.
73, 73. Trunk of the posterior superior cutaneous nerve, perforating the fascia lata, Tab. iv. Fig. 2. n, 73, 73, represents the origin of this nerve.
77. Continued branch going to the external part of the ham.
85. Continued nerve, 73.
128. Internal superior cutaneous nerve, whose origin and connexion, Tab. iv. Fig. 2, shews 124, 125, 126, 127.
129. Continued nerve, 128.
132. Continued nerve, 128.
134. Termination of the internal superior cutaneous nerve in the skin, covering the internal part of the thigh.
136. Internal inferior cutaneous nerve, Tab. iv. Fig. 2. n, 136, represents its origin, it divides into three branches, namely, an internal, middle, and external.
137. Internal bifurcated branch of the nerve, 136.
140. Middle and thicker branch of the nerve, 136, descends on the back of the gastrocnemius internus muscle, and scatters different branches.
144. Continued branch, 140.
148. Continued branch, 140.
199. External cutaneous nerve, the origin of which may be seen in Tab. iv. Fig. 2.
203. Continued nerve, 199.
211. Continued nerve, 199.
217. Continued nerve, 199, which takes a very long course to the inferior part of the leg, and in this course distributes three twigs.
238. First posterior inferior external cutaneous nerve, or if another name of this nerve is better, it may be distinguished by the name of the external superior subsural cutaneous nerve, Tab. iii. Fig. 2, 238, best represents its origin, although it can be seen in Tab. iv. Fig. 2, 238.
244. Continued nerve, 238.
255. Continued nerve, 238.
466. First posterior inferior internal cutaneous nerve, or if it may be otherwise better named, it may be termed the internal superior subsural cutaneous nerve.
500. Posterior inferior external cutaneous nerve, or the inferior subsural external cutaneous nerve. Tab. iv. Fig. 2. 500, shows its origin.
504. Termination of the nerve, 500, in the skin.
506. Branch of the posterior second sacral nerve, going towards the gluteus maximus muscle.
516. Branch of the fourth posterior sacral nerve.
518. Continued branch, 516.
522. Branch of the posterior fifth sacral nerve, going towards the internal inferior part of the gluteus maximus muscle.

PL. XV.

E. Mitchell sculp.

PLATE XV.

This Figure represents the nerves of the right inferior extremity, and also some blood-vessels and the first layer of muscles, such as are situated immediately beneath the integuments and tendinous sheaths. But above all the descent of the crural or great femoral and the first distribution of its branches appears. Moreover, we have endeavoured to leave untouched in their natural situation those nervous branches distributed to muscles. We have represented the cutaneous nerves drawn aside or separated from each other to admit of a more accurate view of the other parts. But in making this engraving, we have attempted as much as is possible to observe and represent the natural form and nature of these nerves.

AA. Iliacus internus muscle.
B. Psoas magnus.
α. Its middle part.
β. Tendon to which the fleshy part of the iliacus internus is joined.
γ. Third head.
δ. Fourth head.
ξ. Fifth head.
θ. Psoas parvus.
ι. Its tendon.
κ. Quadratus lumborum muscle.
λ. Its origin from the crest of the ilium.
ζ. Part of the glutæus medius muscle.
D, H. Sartorius muscle. D. Tendinous beginning arising from the crest of the ilium.
E, F, G. Tensor of the fascia lata, or sheath of the thigh. E. Arising from the crest of the ilium. G. The end where the tendinous portion is *laid back*.
I, L, M, N. Vastus externus muscle. I. Its tendinous portion. N. Insertion into the patella.
K, O, P, Q. Rectus muscle of the leg. O. Its tendon inserted into the patella. P. Place where it inserts *itself* into the patella. Q. Aponeurosis which runs from the tendon over the anterior part of the patella, and afterwards is connected to the first part of the ligament which passes from the patella to the tibia.
R, S, T. Ligament descending from the patella to the tibia. R. Place where it arises from the patella. T. In all this part inserted into the tibia.
U, V, W. Vastus internus muscle. V. Extreme tendon. W. Inserted into the patella.
X. Pectineus muscle or livid muscle.
Y. Long adductor of the thigh (Albinus.)
Z. Gracilis muscle.
AA. Great adductor of the thigh (Albinus.)
BB, CC, EE. Sartorius muscle. cc. Its tendon. ee. Inserted into the tibia.
DD. Semitendinosus muscle.

FF, GG, HH. Biceps cruris. GG. Extreme tendon. HH. Its principal portion inserted into the head of the fibula. GG. Part which belongs to the tibia.

II, KK, PP. Peroneus longus muscle. II. Arising from the head of the fibula. PP. Tendon arising from the exterior part of the muscular fibre.

LL. Soleus muscle.

MM, OO. Extensor longus digitorum pedis in union with the peroneus tertius muscle.

QQ. Peroneus brevis muscle.

TT, NN, RR, SS. Tibialis anticus muscle. N. Arising from the tibia. TT. Its tendon.

UU. Tendon of the extensor proprius pollicis.

VV. Branch of the tendon of the extensor proprius pollicis.

WW. Tendons of the extensor longus digitorum pedis.

XX. Extensor communis digitorum brevis muscle.

YY, ZZ. Gemelli or gastrocnemius muscle. YY. Its tendinous portion.

a, b, c. Soleus muscle. a. Arising from the tibia. c. Tendinous surface.

d. Flexor longus digitorum pedis, arising from the tibia.

e. Tendon of the plantar muscle.

f. Tendon of the tibialis posticus muscle.

I. Crural artery.

II. Crural Vein.

III. Circumflex artery of the ilium cut across.

IV. Arteria abdominalis of Haller.

V. External circumflex artery of the thigh.

ת. Margin or crest of the ilium.

ר. Os pubis and part of its syncondrosis.

1. Branch of the first lumbar nerve.

2. Branch springing from branch the first, going to the skin and muscles.

26. Branch of the second lumbar nerve.

44. External cutaneous nerve.

47. Posterior branch of the external cutaneous nerve, (44) going to the posterior part of the thigh.

71. Anterior branch of the external cutaneous nerve. Continued.

102. Root of the crural nerve, arising from the second and third lumbar nerves.

103. Root of the crural nerve, arising from the fourth lumbar nerve.

104. Nerve termed the crural, great femoral, or anterior.

105, 105, 105. Nervous twigs, arising from the crural nerve, forming that beautiful iliac plexus covering the iliacus internus muscle.

106. Recurrent nerve of the psoas muscle.

108. Musculo-cutaneous trunk arising from the crural nerve, which gives off various branches.

109. Nerve for the pectineus or livid muscle, the distribution of which can be seen in Tab. iv. Fig. 1, n. 110, 111.

112. Musculo-cutaneous trunk, 108, continued.

113. Superior or short nerve for the sartorius.

119. Middle nerve for the sartorius muscle.

124. Middle cutaneous nerve.

181. Nerve arising from the crural nerve going to the rectus muscle of the thigh.

200. Long nerve of the sartorius muscle descending from the internal side of this muscle, it becomes a very little lengthened towards the anterior parts. e. Termination inserted into the inferior part of the flesh.

201. Branch from which the nerve of the crural artery, and for the short adducter muscle of Albinus arise.

204. Anterior cutaneous nerve.

206. Anterior cutaneous nerve, 204, continued.

211. Continuation of the anterior cutaneous nerve.

213. Anterior cutaneous nerve, 204, continued.

218. Termination of the anterior cutaneous nerve.

251. Root of the long inferior nerve for the vastus internus muscle and of the saphenus nerve; for the terminating branches of the former see Tab. iv. Fig. 1. 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, the descent of the latter towards the knee can be seen in Tab. iv. Fig. 1. n. 266, 267, 268, 269, 270, and is also conspicuous in our table.

252, Long or inferior nerve for the vastus internus muscle.

266. Beginning of the saphenus nerve.

267. 1st Branch of the saphenus nerve.

282. 2d remarkable branch of the saphenus nerve.

298. Saphenus nerve continued.

299. 3d branch of the saphenus nerve.

301. α. 4th Branch of the saphenus nerve.

304. 5th Branch of the saphenus nerve.

308, 308. 6th Branch of the saphenus nerve, dividing directly into three small branches.

308. α. 7th Branch of the saphenus nerve which stops at the periosteum covering the tibia,

and seems to terminate there; it is seen in Tab. ii. Fig. 1. n. 313.

314. 8th Branch of the saphenus nerve.

319. 9th Branch of the saphenus nerve.

320. α. 10th Branch of the saphenus nerve going to the malleolus externus.

323. 11th Branch of the saphenus nerve going towards the malleolus externus.

326. 12th Branch of the saphenus nerve going to the malleolus internus and divides into three small branches.

331. 13th Branch of the saphenus nerve; for its distribution, see Tab. 11, Fig. 1. n. 332, 333.

334. 14th Branch of the saphenus nerve.

335. 15th Branch of the saphenus nerve.

336. 16th Branch of the saphenus nerve. These three branches partly terminate in the adipose membrane of the skin below the malleolus internus, or in the skin itself.

337. 17th Branch of the saphenus nerve more singular than the others, for this reason we have termed this nerve—in the preceding table the second or lesser saphenus nerve—it wanders with the accompanying trunk of the saphenus nerve with which in its course it is connected in a threefold manner, 302, 303, 318, towards the *malleolus internus*, and there it terminates in the lateral and opposite part of the leg.

339. Small knot or *ganglion* which the lesser saphenus nerve forms to give off various branches.

359. Lesser saphenus nerve, 337, continued.

363. Root of the internal cutaneous nerve.

364. Internal cutaneous nerve

365. 1st Branch of the internal cutaneous nerve.

366. 1st Branch of the internal cutaneous nerve continued, which is to be accounted as the second branch.

378. 1st Branch of the internal cutaneous nerve continued.

379. 3d Branch of the internal cutaneous nerve, which is distributed to the gracilis muscle and there terminates—our readers may desire to see this nerve in Tab. 1. Fig. 1. but in its stead they will find another going to the *fascia lata*—but we have observed that sometimes one, and sometimes the other, and sometimes both are found in bodies.

388. 4th Branch of the internal cutaneous nerve increasing the 1st branch which has been given off before it, and now is collected into the internal cutaneous nerve itself.

390. 5th Branch of the internal cutaneous nerve perforating near the tendon of the sartorius muscle.

397. 5th Branch, 390, continued.

268. Internal dorsal branch of the superficial peroneal nerve.

270. Branch 268 continued, gives off various branches.

289. External dorsal branch of the superficial Peroneal nerve.

294. External dorsal branch of the superficial peroneal nerve, 289 continued.

296. Branch 294 continued, which is now distinguished by the name of the metatarsal nerve.

408. Continued communicating branch of the tibial nerve.

PL. XVI.

E. Mitchell sculp.

PLATE XVI. FIG. I.

This engraving represents the opposite part of the same right inferior extremity, together with some nerves, blood-vessels, and the first layer of muscles, those which, with the exception of the extremity of the foot, meet the eye, when the skin and tendinous sheaths have been laid back. Therefore our readers will find the subcutaneous small branches of the sciatic nerve, and will take into consideration, that in order to represent the other things more accurately, we have been obliged to remove some of these nervous branches from their position. We wish the same thing said of the origin of the nervus communicans peronæus et tibialis.

A, B, B. Gluteus maximus muscle. B, B. that part which arises from the crest of the ileum and os sacrum, it joins in this place with the *latissimus dorsi.*

C, D, E. Gluteus medius muscle. D. arising from the os ileum. E its tendon.

F. Tensor muscle of the fascia lata of the thigh.

G, H. Vastus externus muscle. G. its tendinous surface.

I, K, L, M, N, O. Biceps cruris muscle. I, its long head. N, L. its short head. K, M, O, its tendon. K, origin from the surface of the long fleshy head, then increasing in size from the junction of the short head. M, O. in this last part it is inserted into the head of the fibula.

P. Part of the poplitæus muscle.

Q, R. Semitendinosus muscle. R. its tendon.

S, T, V, W. Semimembranosus muscle. W. origin of its tendon from the fleshy part.

T. The tendon itself.

U. Adductor magnus femoris muscle of Albinus, or triceps femoris.

X, Y. Gracilis muscle. Y, its tendon.

Z. Sartorius muscle.

a, a, b, c. Gemelli or Gastrocnemii muscles.

b. Origin of the tendon. c, its termination or insertion in the *calcaneum*, which part is with propriety termed the tendo Achillis.

d, g, h. Soleus muscle, h, its tendinous surface.

e. Tendon of the plantar muscle.

f, i, k. Beginning of the peronæus longus muscle.

k. Its tendon.

l. Peronæus brevis muscle.

m. Flexor pollicis longus muscle.

I. Poplitæal artery.

ח. Margin or crest of the ileum.

ך. Syncondrosis of the bones of the *pubis.*

6. Small branch of the first lumbar nerve—for its origin see plate xv. n. 1. 2.

10. Small branch 6. continued.

13. Another small branch of the first lumbar nerve.

15. Small branch 13 continued.

17. Small branch 13 continued.

19. Small branch 13 continued. It now proceeds to the middle part of the gluteus maximus muscle.

27. Small branch of second lumbar nerve.

28. Small branch 27 continued, it now divides.

47. Posterior branch of the external cutaneous nerve, 44.

57. Branch 47 continued.

59. Branch 47 continued.

62. Branch 47 continued.

65. Branch 47 continued.

4. 1st Lateral branch of the posterior superior cutaneous nerve, for its descent and connexion see plate xviii. n. 1, 2.

5. A small branch which bends upwards, proceeding to the scrotum in the male, but in the female reaches the posterior part of the greater labia.
6. Branch 5 continued.
14. Branch 4 continued.
18. Branch 4 continued.
24. Termination of branch 4.
33. Second lateral branch of the posterior superior cutaneous nerve.
37. Branch 33 continued. For the further progress of this nerve see plate xiv. under the numbers of 26, 27, 33, 37.
44. Third lateral branch of the posterior superior cutaneous nerve. For the origin and connexion of this nerve, see Plate xviii. n. 42, 44, 46.
46. Branch 44 continued.
54. Nerve 44 continued, is divided in this place.
64. Fourth lateral branch of the posterior superior cutaneous nerve. For its origin see Plate xviii. n. 64.
68. Branch 64 continued. Plate xiv. n. 70, shows the termination of this nerve.
73. Trunk of the posterior superior cutaneous nerve. The origin of this nerve is seen in Plate xviii. n. 73, 73.
77. Nerve 73 continued, going to the external part of the ham.
85. Nerve 73 continued. Plate xiv. n. 85, shows its termination.
128. Internal superior cutaneous nerve. Plate xviii. n. 124, 128, 129, shows its origin and connexion.
129. Nerve 128 continued.
132. Nerve 128 continued.
134. Termination of the internal superior cutaneous nerve in the skin, covering the internal part of the thigh.
136. Internal inferior cutaneous nerve. Plate xviii. n. 136, represents its origin ; it is divided into three branches, an internal, a middle, and external.
137. Branch of nerve 136 ; on the inside it bifurcates and terminates in the skin. See Plate xiv. n. 137.
140. Middle and thicker branch of nerve 136 descends on the back of the internal *Gastrocnemius* muscle, and
141. Divides into an external small branch which ends by two twigs.
144. Branch 140 continued.
148. Branch 140 continued.
199. External cutaneous nerve, the origin of which can be seen in Plate xviii. n. 199.
203. Nerve 199 continued.
211. Nerve 199 continued.
235. Communicating nerve of the peroneal and posterior inferior cutaneous nerve slightly laid back.
238. First external posterior inferior cutaneous, or cutaneous sural nerve.
244. Nerve 238 continued; the external small branch of the nerve with two of its twigs, we have delineated in Plate xiv.
387, 387. Tibialis communicans nerve.
391. Nerve 387 continued.
392. Nerve 387 continued.
396. Nerve 387 continued.
397. Supra-malleolar nerve.
408. Tibialis communicans nerve continued.
466. First internal posterior inferior cutaneous nerve, or internal superior subsural cutaneous nerve. Its origin is seen in Plate xviii. n. 466, its branches are seen in Plate xiv. n. 466.
469. Termination of cutaneous nerve 466.
493. Second internal posterior inferior cutaneous nerve, or internal subsural cutaneous nerve. For its origin see Plate xviii. n. 493, it divides into two small branches.
197, 197. Tibialis or tibieus nerve.
198. Peroneal nerve.
260. Superficial branch of peroneal nerve cut off.
425. Trunk of the nerve for the soleus, the poplitæal and gastrocnemii muscles.
426. Nerve going by two filaments to the soleus muscle.
436 Nerve descending to the right head of the gastrocnemius muscle.
439. Nerve of the poplitæus muscle and interosseal ligament connecting the tibia and fibula.
446. Nerve of the soleus muscle and flexor longus pollicis pedis.
267. First branch of the saphenus nerve seen on the back.
297. Saphenus nerve seen on the back continued.
506. Branch of the second posterior sacral nerve.
511. Branch of the third posterior sacral nerve.
516. Branch of the fourth posterior sacral nerve.
518. Branch 516 continued.
522. Branch of the posterior fifth sacral nerve going to the inferior and internal part of the gluteus maximus muscle.
523. Superior bifurcating branch of the branch 522, it divides into two twigs.

Figure II.

Since by reason of the situation of this right inferior extremity (which a little before we have delineated on the same plate) the rules of drawing have embarrassed us; since we have depicted the extremity of the foot less, in order that the parts situated on its sole should be more distinctly seen; for the better and more convenient view of these things, nor forgetful of these rules of the art, we have attempted to represent the foot free from the leg, and therefore, of course, cut off. By this means, this engraving of the sole of the foot, stripped of the common integuments, affords a view of the *plantar aponeurosis*, and of some superficial nerves, blood-vessels, and first layer of muscles.

a, b, c, d, e, f, g, h. Middle of the plantar aponeurosis joined on one side with the aponeurosis covering the abductor muscle of the little toe, on the other side with that covering the abductor muscle of the great toe. a. Origin from the tuberosity of the calcaneum d, e, f, g, h; five portions belonging to the toes.

i, k, l, m, n. Aponeurosis covering the abductor muscle of the little toe. k. Its origin from the tuberosity of the calcaneum. i. Part which is inserted into the first head of the metatarsal bone of the little toe. m. Portion which is joined with the middle plantar aponeurosis. n. Part which is given to the origins of the flexor parvus minimi digiti and of the interosseal muscle of the toe of the same foot.

o, p. Aponeurosis covering the abductor muscle of the great toe. p. Its origin from the calcaneum.

α. Os calcis or *calcaneum*.

10. Small branch of the internal branch 14 of the internal plantar nerve 6. See Plate xviii. n. 14, 6.

11. Its first twig ends in the fat. Its second goes to the skin.

13. Its third goes to the internal side of the foot and there terminates.

13. α. Fourth twig of the small branch 10 ends in the fat.

64. Middle branch, otherwise called external or superficial, descends on the side of the external plantar nerve of the 5th toe, and gives off.

65. A small branch to the little toe. It is termed the plantar nerve, or rather the external digital nerve of the little toe. For the origin and connexion of all these plantar or digital nerves, see Plate xviii.

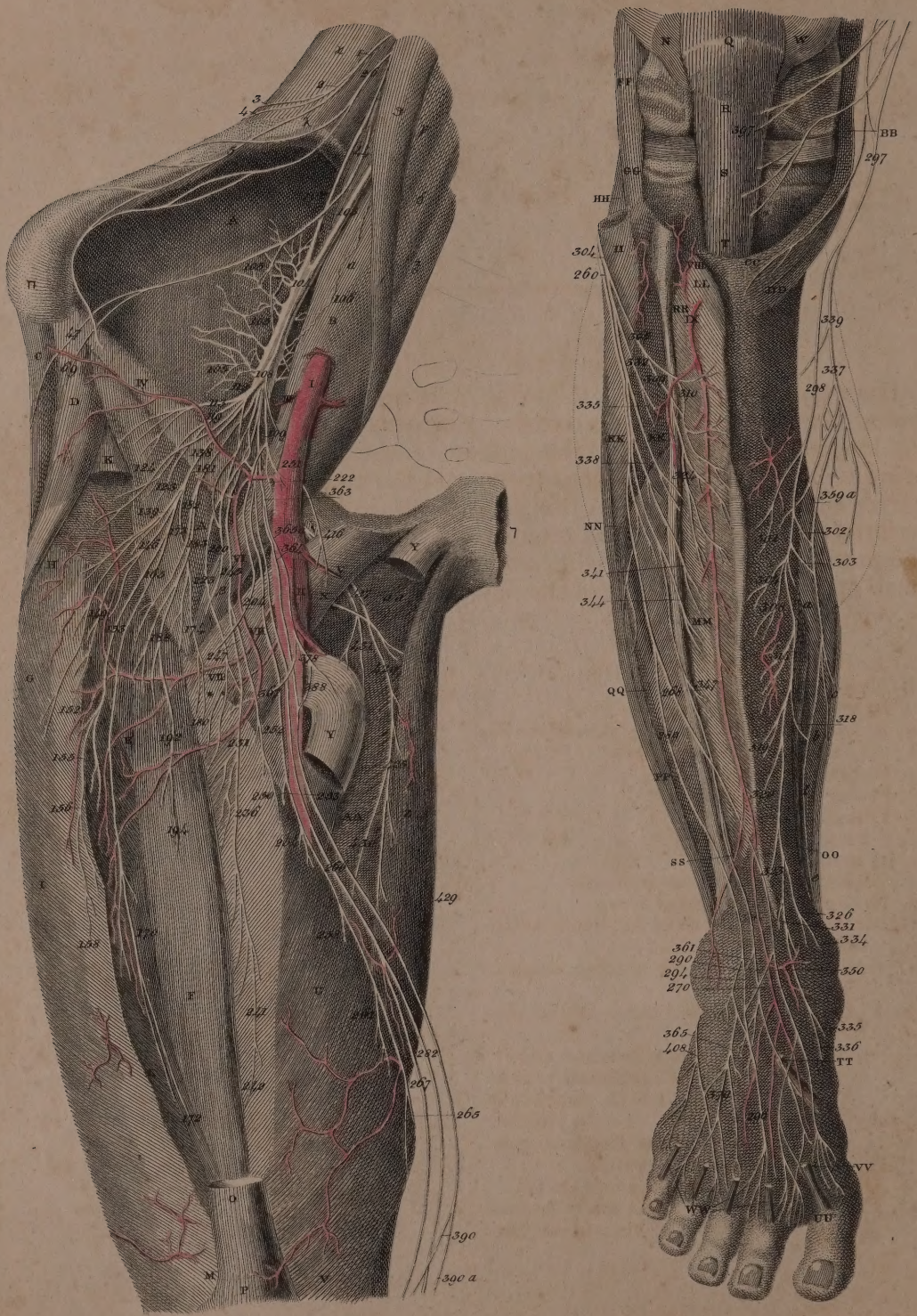
66. Another small branch of the middle branch 64, which goes, on the external side of the fifth toe, towards the back of the foot, and is called the dorsal small branch.

67. External branch of the external plantar nerve.

68. Small branch of this nerve going to the abductor muscle of the little toe.

69. Small branch of branch 67, going to the short flexor and interosseal muscle of the little toe.

PL. XVII.



E. Mitchell sculp.

PLATE XVII.

Having cut through the following muscles, viz. the tensor vaginæ femoris, the sartorius, rectus cruris, gastrocnemii, tibialis anticus, extensor longus digitorum pedis, the tendon of the extensor proprius pollicis being removed, the ligamentous parts, and the cutaneous and subcutaneous nerves and vessels laid back; this plate shows, in their natural situation anteriorly, the second and third layer of nerves, vessels, and muscles, and also the principal branches of the obturator or lesser femoral nerve, as far as the small space and minuteness of the figures will permit.

A, A. Iliacus internus muscle.
B. Psoas magnus muscle.
α. Its middle part.
β. Its tendon to which the fleshy fibres of the iliacus internus are attached.
γ. Its third head.
δ. Fourth head.
ξ. Fifth head.
ϑ. ι. Psoas parvus muscle.
ι. Its tendon.
κ. Quadratus lumborum muscle cut off.
λ. Its origin from the crest of ileum.
C. Anterior and lateral part of the gluteus medius muscle.
D. Greatest portion of the gluteus minimus muscle.
E, F. Cruralis or crureus muscle. F. Its tendon.
G, H, I, L, M, N. Vastus externus muscle. G. Beginning of its tendinous portion. H. Arising from the os femoris. I. Tendinous portion. L. Its tendon. M. Extremity of its tendinous part. N. Insertion into the patella.
K. Origin of the rectus cruris muscle cut off.
O, P, Q. Tendon of the rectus cruris inserted into the patella. P. Place where it inserts itself into the patella. Q. Aponeurosis which runs from the tendon of this muscle, first over the anterior surface of the patella, and then is connected to the superior part of the ligament which attaches the patella to the tibia.
R, S, T. Ligament descending from the patella to the tibia. R. Place where it arises from the patella. T. In all this part inserted into the tibia.
U, V, W. Vastus internus muscle. V. Its tendon. W. Inserted into the patella. * arising from the os femoris.
X. Pectineus muscle.
Y, Y. Adductor longus muscle cut through that the principal branches of the obturator nerve may be more distinctly seen. Y. Origin cut off arising from the ligament, by which the bones of the pubis are connected.
Z. Gracilis muscle.
AA, aa. Adductor magnus femoris. aa. Its origin from the bones of the pubis.
BB, CC. Tendon of the gracilis muscle. CC. Inserted into the tibia.
DD. Tendon of the semitendinosus muscle inserted into the tibia.

FF, GG, HH. Biceps cruris muscle. GG, HH, its extreme tendon. HH. the principal part inserted into the head of the fibula. GG, part attached to the tibia.

II, KK, PP. Peroneus longus muscle. II, arising from the head of the fibula. PP. tendon arising from the external muscular fibres.

NN, QQ. Peroneus brevis muscle, upon which the traces of the extensor longus digitorum pedis, which has been removed are impressed.

LL, MM, RR, OO. Tibialis posticus muscle. LL. its origin from the tibia. RR. origin from the spine of the fibula. OO. its tendon.

SS. Flexor longus pollicis pedis muscle.

TT. Tendon of the tibialis anticus muscle cut short.

UU. Tendon of the extensor proprius pollicis muscle cut through.

VV. Branch of the same tendon cut through.

WW. Tendons of the extensor longus digitorum pedis cut short.

XX. Extensor brevis digitorum communis pedis.

a, b, c. Soleus muscle. a. arising from the tibia. c. its tendinous surface.

d. Flexor longus digitorum pedis muscle, arising from the tibia.

e. Tendon of the plantar muscle.

I. Crural artery.

II. Deep femoral artery.

III. Circumflex artery of the ileum cut short.

IV. Abdominal artery of *Haller*.

V. Internal circumflex artery of the thigh.

VI. External circumflex artery of the thigh.

VII. Two branches of the deep femoral artery.

VIII. Recurrens tibialis artery.

IX. Anterior tibial artery.

ה. Margin, or crest of the ileum.

ו. Synchondrosis of the bones of the pubis.

ז. Obturator foramen.

1. Branch of the first lumbar nerve.

2. Branch arising from branch 1. and dividing into

3, 4. Two nerves going to the skin and muscles.

5. Branch 1. continued.

26. Branch of the 2d lumbar nerve.

44. External cutaneous nerve.

47. Posterior branch of the external cutaneous nerve 44, descending towards the posterior and lateral part of the thigh, its distribution is seen in Plate xiv. n. 48, 50, 52, 53, 65.

69. Anterior branch of the external cutaneous nerve 44, going to the posterior and lateral part of the thigh, its progress is shewn in Plate xiii. n. 46, 45, 47, 69, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 99.

102. Root of the crural nerve, arising from the 2d and 3d lumbar nerves.

103. Root of the crural nerve, arising from the 4th lumbar nerve.

104. Crural, or great femoral, or anterior nerve.

105, 105, 105. Nervous branches arising from the crural nerve forming the beautiful iliac plexus which covers the iliacus internus muscle.

106. Recurrent nerve of the psoas muscle.

108. Trunk of the musculo cutaneous, arising from the crural nerve.

109. Branch to the pectineus or lividus muscle.

112. 108 continued.

113. Superior or short nerve for the sartorius muscle.

119. Middle nerve for the sartorius muscle.

123. Branch of nerve 119.

124. Middle cutaneous nerve.

138. Branch from which the nerves for the vastus externus and short nerve, or superior of the cruralis muscle take their origin.

139. Superior, short, or first nerve for the vastus externus muscle, distributed to it by five or six branches.

146. Middle or second nerve of the vastus externus muscle.

149. Nerve 146 continued.

152. Termination of the middle nerve for the vastus externus muscle.

153. Third or inferior nerve of the vastus externus muscle.

155. Nerve 153 continued.

156. 155 continued.

158. Termination of the 3d or inferior nerve of the vastus externus muscle.

165. Fourth, or long, or inferior nerve of the vastus externus muscle, it takes a long course among the rest of the nerves of the vastus externus muscle, and almost reaches the knee.

170. Nerve 165 continued.

172. Termination of nerve 165. All the nerves of the vastus externus muscle with their branches, are removed a little from their natural situation, in order that they may be more accurately viewed.

173. Superior, or short nerve, for the cruralis or crureus muscle.
174. 173 continued.
180. Termination of nerve 173.
181. Nerve arising from the crural nerve going to the rectus cruris muscle.
182. Its external branch bifurcates.
183. Its internal branch gives off numerous small branches.
188. Branch 183 continued.
192. 183 continued.
194. Termination of branch 183.
200. Longer, or inferior nerve of the sartorius muscle, descending on its internal side, and cut short; but its further progress can be seen in Plate XV. n. 200.
204. Anterior cutaneous nerve. See its distribution in Plate XIII. n. 205, 206, 207, 208, 209, 210, 211, 213, 218, 219, 220, and also in Plate XV. n. 204, 206, 211, 213, 218.
222. Nerve going to the short adductor muscle of Albinus, and there anastomosis with the anterior branch of the obturator going to the same muscle.
223. Long or inferior nerve for the cruralis or crureus muscle; it descends in the middle of the thigh towards the knee.
231. 223 continued.
236. 223 continued.
241. 223 continued.
242. Termination of the nerve 223.
245. Superior or short nerve of the vastus internus muscle, near to the preceding nerve 223; it arises separately from the crural nerve, and is distributed to the superior part of the same muscle.
247. 245 continued.
248. Branch of nerve 245.
250. Termination of 245.
251. Root of the long or inferior nerve of the vastus internus muscle, and of the saphenus nerve.
252. Long or inferior nerve of the vastus internus muscle.
253. First branch of nerve 252.
254. Second do. do.
258. Third do. do.
261. Fourth branch of nerve 252; it divides into three small branches.
265. Termination of nerve 252 on the internal part of the thigh.
266. Beginning of the saphenus nerve, or rather the saphenus nerve itself.
267. First branch of the saphenus nerve.
282. Second remarkable branch of the nerve 266.
297. Saphenus nerve continued.
298. Saphenus nerve continued.
301. Fourth branch of the saphenus nerve 266.
302, 303. Two anastomosing branches which join the saphenus nerve, with its remarkable branch 337.
304. Fifth branch of the saphenus nerve.
308. Sixth branch of the saphenus nerve.
314. Eighth branch of the saphenus nerve.
318. Anastomosing branch which unites the saphenus nerve 266 with its remarkable branch 337.
319. Ninth branch of the saphenus nerve, which goes by two twigs to the periosteum covering the tibia.
320. Tenth branch of the saphenus nerve 266, proceeding towards the malleolus externus.
323. Eleventh branch of the saphenus nerve 266, which goes towards the malleolus externus, and ends in the fat.
326. Twelfth branch of the saphenus nerve.
331. Thirteenth branch of the saphenus nerve.
334. Fourteenth branch of the saphenus nerve.
335. Fifteenth branch of the saphenus nerve.
336. Sixteenth branch of the saphenus nerve.
337. Seventeenth branch of the saphenus nerve 266, more remarkable than the others; therefore we call this the second or lesser saphenus nerve. It passes along with the trunk of the saphenus nerve, and in its course is connected with it by anastomosis in a threefold manner, n. 302, 303, 318, going to the malleolus internus, and terminating in the lateral and opposite part of the leg.
339. Small knot or ganglion which the lesser saphenus nerve forms, for the purpose of giving off various branches.
359. a. Nerve 337 continued.
363. Root of the internal cutaneous nerve.
364. Internal cutaneous nerve.
365 a. First branch of the internal cutaneous nerve.
367. First branch continued, 365 a.
378. First branch continued.
388. Fourth branch of the internal cutaneous nerve, a small branch of the first branch 365 a. and has the same termination; it anatomosis with the internal cutaneous nerve itself.

390. Fifth branch of the internal cutaneous nerve perforating the sartorious muscle near its tendon.
390 a. Internal cutaneous nerve continued distributing itself to the saphenus nerve.
416. Egress of the obturator nerve from the *foramen ovale.*
417. Anterior branch of the obturator nerve going to the gracilis muscle.
420. Anterior branch of the obturator nerve continued.
425. Anterior branch of the obturator nerve continued.
430. Anastomosing branch of the anterior branch 417, which connects this nerve with the saphenus 266.
431. Branch of the obturator nerve going to the long adductor muscle of the thigh.
260. Superficial peroneal nerve.
268. Internal dorsal branch of the superficial peroneal nerve.
270. Branch 268 continued, giving off various small branches.
289. External dorsal branch of the superficial peroneal nerve 260.
294. External dorsal branch of the superficial peroneal nerve 289 continued.
296. Branch 294 continued, which is now called the internal metatarsal nerve.
304. Deep peroneal nerve.
305. Branch of the deep peroneal nerve descends deeply between the tibialis anticus, and peroneus longus muscles, and terminates by a number of branches and twigs in the tibialis anticus muscle.
309. Branch 305 continued.
310. Anastomosing branch.
324. 305 Continued, terminating in two small branches.
332. Branch of the deep peroneal nerve 304, which bifurcates.
335. Branch of the deep peroneal nerve 304, which goes to the extensor longus digitorum, and extensor proprius pollicis muscles.
338. Branch of the deep peroneal nerve 304, which proceeds partly to the tibialis anticus, extensor communis digitorum, and extensor proprius pollicis muscles.
341. Branch 338 continued, which dips into the tibialis anticus muscle.
344. Branch of the deep peroneal nerve 304, proceeding by two small branches to the tibialis anticus muscle.
347. Branch of the deep peroneal nerve 304.
350. Branch of the deep peroneal nerve 304, called the internal dorsal, or superficial nerve.
361. Branch of the deep peroneal nerve 304, also termed the external dorsal or deep, it runs beneath the extensor digitorum brevis muscle towards the extremity of the foot.
365. External metatarsal branch 290 continued.
370. 290 Continued.
408. Communicating branch of the tibial nerve continued.

PL. XVIII.

Fig. 1.

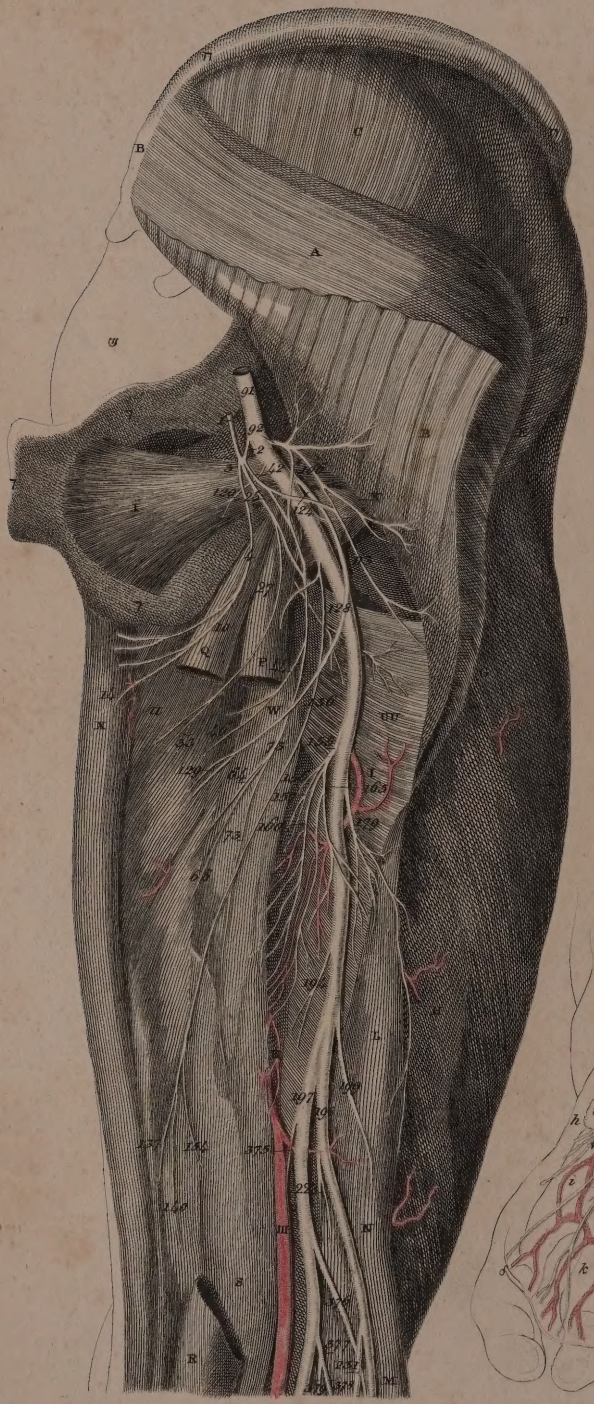
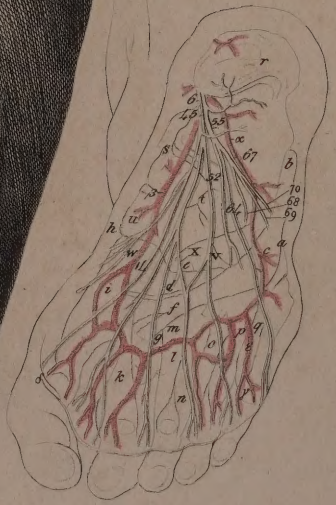


Fig. 2.



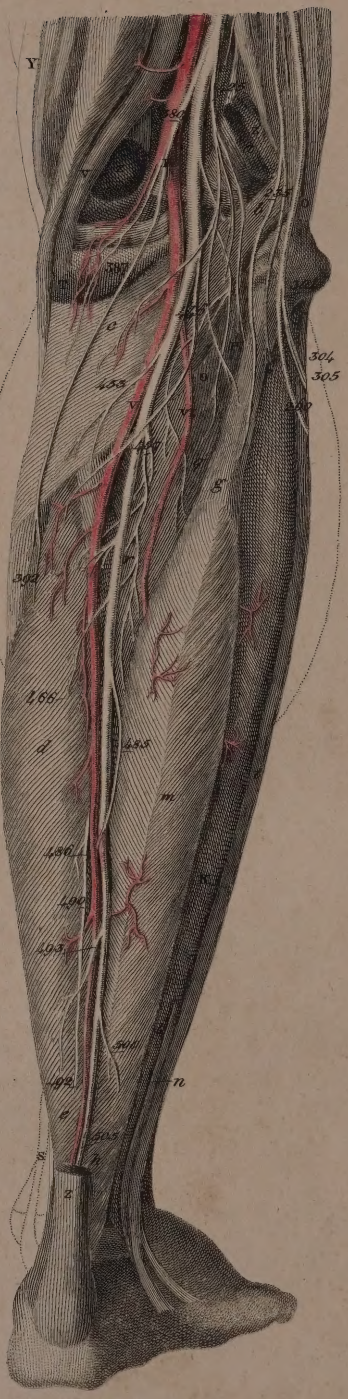


PLATE XVIII

Fig. 1.

This Engraving gives a view of the posterior surface of the same right inferior extremity, the following muscles having been cut off or laid aside, viz. the Pyriformis, the superior and inferior Gemellus, Quadratus femoris, Biceps flexor cruris in part, Plantaris, Semitendinosus, Sartorius, Soleus, &c., the aponeurotic and ligamentous parts have been removed, together with the cutaneous and subcutaneous vessels and nerves; it also represents the second and third layer of muscles, the second and third series of vessels and nerves, and especially the descent of the Sciatic or Posterior femoral nerve along the thigh. But in this figure, by reason of the circumstances mentioned before, the situation and form of the nerves represented in these parts, cannot be strictly observed.

A, B, B. Glutæus maximus muscle removed from its superior attachment and completely turned back, that the sciatic nerves in their descent from the pelvis, and the origin and distribution of the Glutæal nerves may be more distinctly seen.

C, D, E. Glutæus medius muscle. D. Origin from the ileum. E. Its tendon.

F. Tensor muscle of the sheath of the thigh.

G, H. Vastus externus muscle. G. Its tendinous surface.

I.* Obturator internus. *Tendon by which it is inserted.

K. Obturator externus muscle.

L, M, N, O. Short head of the biceps muscle. M, O. Its tendon at this extreme part inserted into the head of the fibula.

P. Long head of the biceps cruris muscle laid back.

Q, R. Semitendinosus cut off. Q. Its head laid back. R. Its tendon cut off.

S, T, V, W. Semimembranosus muscle. W. Origin from the back of the tuberosity of the ischium. S. Its fleshy belly. V. Posterior aponeurosis which is inserted below the root of the head of the tibia. T. Anterior aponeurosis which is implanted into the internal margin of the tibia.

u, uu. Adductor magnus femoris muscle. u. Part arising from the os pubis. uu. Extremity attached superiorly to the os femoris.

X, Y. Gracilis muscle. Y. Its tendon.

Z, Z, z. External and internal heads of the Gemellus muscle of the leg. z. Tendo Achillis.

a. Plantar muscle cut through.
b, c. Popliteus muscle. c. Its tendinous portion. b. Its tendon.
d, e. Flexor longus digitorum pedis muscle. e. Its tendon.
f, i, k. Peroneus longus muscle. f. Its origin from the fibula. i. Tendon arising from the flesh and inserted into the extremity of the foot.
g, h, m. Flexor longus pollicis pedis muscle. g. Its origin from the tibia. m. Its fleshy belly. h. Tendon proceeding to the great toe.
l, n. Peroneus brevis muscle. n. Part of the tendon arising from the flesh.
o, p, q, r, s. Tibialis posticus muscle. o. Part which arises from the tibia. p. Part arising from the fibula. q. Tendinous surface. s. Its tendon.
I. 1st Perforating artery of the thigh.
II. 2d Do. do.
III. Crural artery.
IV. Poplitœal artery.
V. Posterior tibial artery.
VI. Peroneal artery.
ת. Crest of the ileum.
ר. Syncondrosis of the bones of the pubis.
ק. Internal surface of the bones of the pubis.
ש. Superior part of the ileo-sacral notch.
1. Posterior Superior cutaneous nerve, coming out separately from the pelvis, near to the schiatic nerve.
2. Nerve arising from the sciatic nerve increasing the posterior and superior cutaneous nerve 1.
4. First lateral branch of the posterior superior cutaneous nerve.
10. Branch 4 continued.
14. Branch 4 continued. Plates xiv. and xvi. shew its further distribution, n. 5, 6, 10, 14, 18, 24, 26, 27.
25. Commencement of the second lateral branch of the posterior superior cutaneous nerve.
27. Second lateral branch of the posterior superior cutaneous nerve continued.
33. Do. do. do.
42. Superior posterior cutaneous nerve continued.
44. Third lateral branch of the posterior superior cutaneous nerve.
46. Branch 44 continued. See its distribution in plates xiv. and xvi. n. 47, 48, 50, 52, 53, 57, 59, 62, 65.
64. Fourth lateral branch of the posterior superior cutaneous nerve.
66. Branch 64 continued. Plate xiv. n. 68, 70, shows its ultimate distribution.
73, 73. Trunk of the posterior superior cutaneous nerve continued.
91. Sciatic or posterior femoral nerve coming out of the cavity of the pelvis.
92. Branch of the sciatic nerve, distributed to the glutæus maximus by various twigs and filaments.
106. Branch 92 continued.
113. Do. do.
120. Branch to the superior and inferior geminus muscles laid back and cut through.
124. Origin of the internal superior cutaneous nerve.
128. Internal superior cutaneous nerve.
129. Nerve 128 continued.
136. Internal inferior cutaneous nerve is divided into three branches, an internal, a middle, and an external.
137. Internal branch of nerve 136, bifurcates and terminates in the skin.
140. Middle and thicker branch of nerve 136, descends on the back of the gastrocnemius internus muscle, and scatters various branches which can be seen in plate xiv. n. 144, 148.
154. External branch of nerve 136 quickly terminates in the skin.
156. Branch of trunk 155 going to the triceps muscle.
157. Branch of the trunk 155.
160. Branch of trunk 155 going to the semimembranosus muscle.
165. Branch of the trunk from which arise the nerves going to the semimembranosus, semitendinosus, and to the long and short heads of the biceps cruris muscle.
179. Branch arising from the sciatic nerve, goes to the short head of the biceps muscle and terminates by various filaments.
194. Branch distributed to the long head of the biceps muscle.
197. Tibial nerve.
198. Peroneal nerve.
199. External cutaneous nerve. Its progress un-

der the skin is seen in plate xiv. n. 203, 211, 217.

228. Branch arising from the peroneal nerve goes to the short head of the biceps muscle.

231. Common trunk of the communicating peroneal branch and posterior inferior cutaneous nerve.

235. Trunk of the same nerve continued, its further course is seen in plate xiv. n. 238, 244, 255, and in plate xvi. n. 238.

260. Superficial peroneal nerve, the progress of this nerve towards the anterior part of the thigh, is seen in plate xvii. n. 268, 270, 289, 290, 294, 296.

304, 304, 305. Deep peroneal nerve, its distribution to the anterior part of the leg is seen in plate xvii. n. 305, 309, 310, 324, 332, 335, 338, 341, 344, 347, 350, 361, 365, 370.

375. Nerve going to the soleus muscle.

376. Nerve going to the short head of the biceps cruris.

377. Common nerve for the gastrocnemius and plantar muscles.

378. Branch of the nerve 377, going to the right head of the gastrocnemius muscle.

379. The branch 377 going to the plantar muscle.

380. The nerve from which the branch distributed to the left head of the gastrocnemius, and soleus muscles arises, and also the communicating tibial nerve.

387. Communicating tibial nerve.

392. Communicating tibial nerve continued, its distribution is seen in Plate xvi. n. 391, 392, 396, 397, 408, and in Plate xvii. n. 408.

425. Common nerve of the soleus, gastrocnemius, and poplitœus muscles.

446. Common or proper branch for the soleus, and flexor longus pollicis muscles.

453. Branch distributed to the body of the soleus muscle: it bifurcates.

457. Common branch of the nerve for the tibialis posticus, flexor longus digitorum pedis, flexor longus pollicis pedis muscles, and also of the superior inferior internal cutaneous nerve.

466. Posterior inferior cutaneous nerve itself; the distribution of this nerve is seen in Plate xiv. n. 466.

485. Branch distributed to the tibialis posticus muscle, and terminating by a few twigs in its fleshy substance.

486. Branch distributed to the flexor longus digitorum pedis muscle.

490. Branch 486 continued.

492. Termination of branch 486.

493. Second posterior inferior internal cutaneous nerve, or internal inferior subsural cutaneous nerve, it divides into two small branches.

500. Second posterior inferior external cutaneous nerve, or inferior external subsural cutaneous nerve.

502. Posterior inferior cutaneous nerve continued; see its distribution in Plate xiv. n. 503, 504.

505. Termination of the tibial nerve.

Figure. II.

Actuated by the same reasons which induced us to represent the sole of the foot by itself in Plate XVI. Figure II. we have attempted here also to give a view of it detached from the leg. This figure, therefore, of the sole of the same right foot, represents the second and third layer of vessels and nerves. These parts being cut through, viz. the plantar aponeurosis, the abductor minimi digiti, abductor pollicis, flexor brevis digitorum pedis, that head namely that joins the flexor digitorum longus muscle in the sole of the foot, the lumbricales, flexor brevis minimi digiti, flexor brevis pollicis, transversalis pedis, adductor pollicis muscles, with various tendons and ligaments, the following objects present themselves to the view.

a. Tendon of the peroneus brevis muscle.

b, c, d, e, f, g. Tendon of the peroneus longus muscle.

h, i. Two extremities of the tendon of the tibialis anticus muscle.

k, l, m, n, o, p, q. Interosseal muscles.

r. Os calcis or calcaneum.

s. Talus or astragalus.

t. Os cubiforme or cuboid.

u. Os naviculare.

v. Os cuneiforme medium.

w. Os cuneiforme magnum.

x. Os cuneiforme minus.

α. External plantar artery.

β. Internal plantar artery.

γ. External digital artery.
. Internal digital artery.
ε. Interosseal artery
6. Internal branch of the internal plantar nerve.
14. Continued internal branch of the inner plantar nerve, which now forms the internal plantar nerve of the great toe.
45. External branch of the internal plantar nerve.
52. Internal, termed also deep branch of the external plantar nerve 55.
55. External plantar nerve.
64. Middle or external branch, termed also superficial, of the external plantar nerve 55, it descends to the external side of the little toe.
67. External branch of the external plantar nerve 55.
68. A branch of this nerve supplying the adductor muscle of the small toe.
69. A branch of the nerve 67, supplying the flexor brevis and interosseal muscle of the little toe.
70. A branch going to the flexor accessorius, or Massa Carnea Jacobi Sylvii.

PL. XIX.

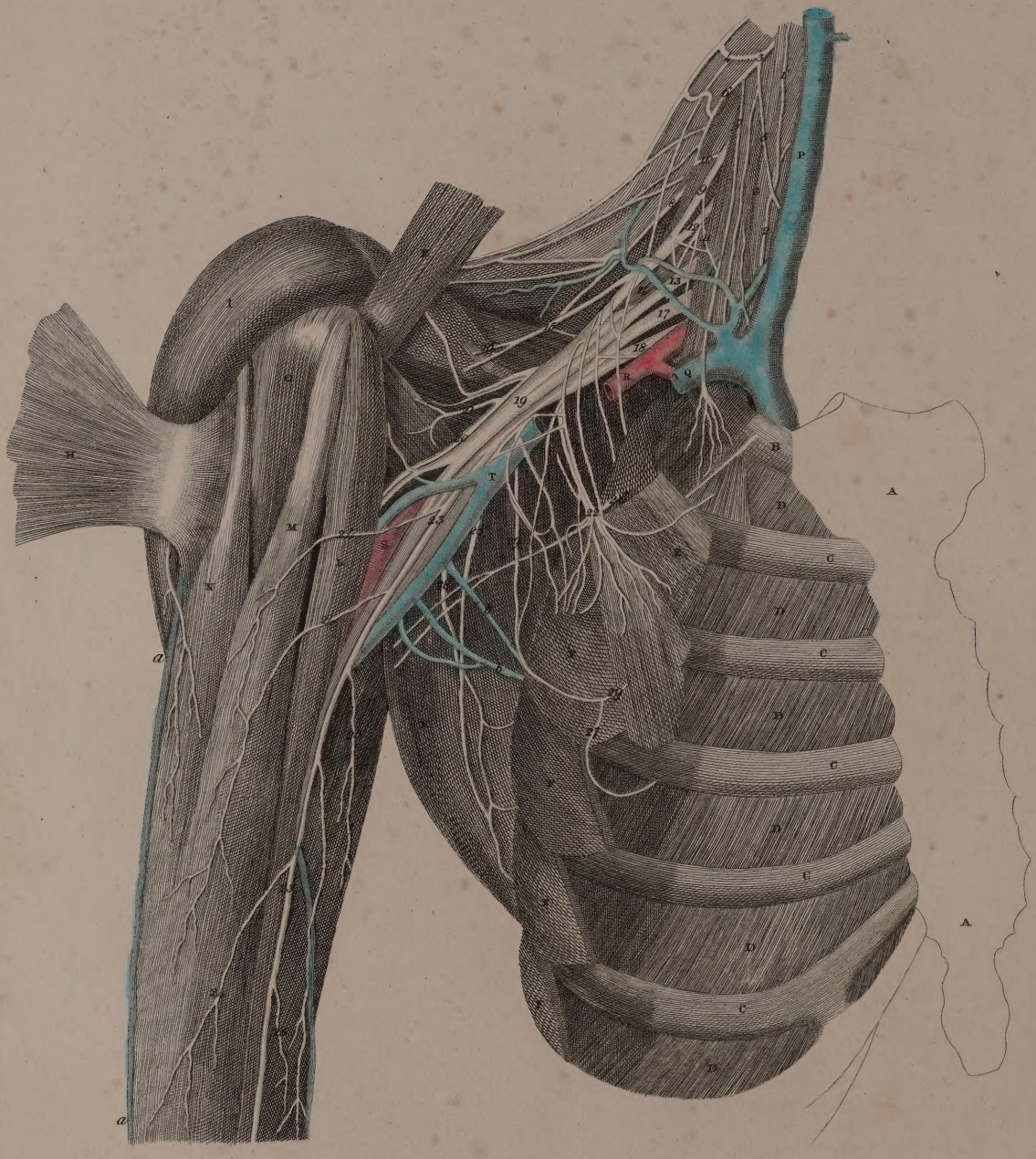


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PLATE XIX.

Nerves of the Arm.

A. A. Sternum.
B. First rib. C, C, C, C, C. other true ribs and their cartilages.
D, D, D, D, D, D. Intercostal muscles.
E.E. Pectoralis minor muscle cut through, and laid back.
F, F, F, F. Serratus magnus muscle where it is inserted into the ribs.
G. Rectus capitis anticus major.
H. Pectoralis major muscle, cut short and laid back.
I. A large portion of the deltoid muscle.
K. Anterior surface of the latissimus dorsi muscle.
L. Coraco-brachialis muscle.
M. Shorter head of the biceps flexor humeri. N. its longer head.
O. Head of the humerus surrounded only by the capsular ligament.
P. Internal jugular vein.
Q. Subclavian vein, cut short.
R. Subclavian artery.
S. Humeral artery.
T. Trunk of the veins of the arm, which is a continuation of the subclavian vein. a. a. Cephalic vein. b. b. Veins which come from the muscles occupying the anterior surface of the scapula, and are going to join the axillary vein.
1. Branch of the second cervical nerve, which descends to the sterno-thyroid muscle.
2. Intercostal nerve, running over the rectus capitis anticus major muscle.
3. Third cervical nerve. 4. Its posterior anastomosing branch. 5. Another anterior branch communicating with the intercostal nerve. 6. A branch which goes to form the supra scapular nerve. 7. First root of the phrenic nerve.
8. Posterior branch of the fourth pair of cervical nerves.
9. Fifth pair of cervical nerves. 10. A small branch of it going to the supra scapular nerve. 11. Another root of the phrenic nerve.
12. Sixth pair of cervical nerves.
13. Seventh pair of cervical nerves.
14. Portion of the scalenus medius muscle.
15. Supra scapular nerve.
16. Branch of 15, which passes through the notch in the superior costâ of the scapula.
17. Eighth cervical nerve.
18. First dorsal nerve.
19. Brachial plexus of nerves consisting of the inferior cervical and first dorsal nerves.
20. Musculo-cutaneous nerve. 21. A small branch to the sub-scapular muscle. 22. Another branch distributed to the pectoralis major muscle.
23. Internal cutaneous nerve. 24, 24, 24. Three of its branches going to the biceps muscle. 25, 25. Branches to the triceps muscle.
26. Branch proceeding from the second pair of dorsal nerves, which after having passed through the intercostal space, gives off a branch, and having perforated the intercostal muscles, approaches the axilla to supply the skin and glands in that region *(now generally called the superior intercosto-humeral nerve.)*
27. Branch of the fourth dorsal nerve which in the same manner passes out of the thorax to supply the skin covering the serratus magnus muscle (now called the *inferior intercosto-humeral nerve.)*
28, 28. Nerves from the brachial plexus, supplying the latissimus dorsi and subscapular muscles.
29, 29. Other nerves going to the pectoralis major muscle, cut short.

PL.XX.

Fig.1.

Fig.2.

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PLATE XX.

Fig. 1.

Superficial Nerves of the Forearm.

A, A. The forearm covered with the superficial fascia.
B, B, B, B. Tendons of the flexor muscles of the fingers.
C. Tendons of the flexor longus pollicis muscle.
D. Abductor pollicis muscle.
E. Abductor minimi digiti muscle.
F. Flexor brevis proprius minimi digiti.
G. Abductor brevis pollicis muscle.
H. Basilic vein dividing.
I. Cephalic vein dividing
K. Median cephalic vein.
L. Median basilic vein.
M. Median, or internal radial vein.
1. Branch of the internal cutaneous nerve which passes over the median basilic vein and is lost in the superficial fascia of the forearm.
2. Musculo-cutaneous nerve, continued.
3. Branches of it which run over the median or internal radial vein to terminate in the subcutaneous cellular tissue.
4. Middle cutaneous branch from the internal cutaneous nerve.
5, 6. Anastomoses between the musculo-cutaneous and middle cutaneous branch, 4.
7, 7. Cutaneous branch of the musculo-cutaneous nerve, which proceeds as far as the palm of the hand.
8. Anastomosis between the internal cutaneous nerve and its middle cutaneous branch, 4.
9. Cutaneous branch of the median volar nerve.
10, 10. Two branches from the middle cutaneous branch. 4. Connected with the median volar branch 9.
11, 11, 11. Three branches proceeding from the musculo-cutaneous nerve, and uniting with the volar branch of the median nerve, 9.
12. Nerve proceeding from the dorsal branch of the radial nerve and anastomosing with a filament of the musculo-cutaneous nerve.
13, 13. Two branches arising from this anastomosis and supplying the muscles and skin of the thumb.
14. Cutaneous palmar branch, derived from the middle cutaneous branch, 4.
15, 15. Filaments of branch 14, distributed through the palmaris brevis muscle, and the cellular membrane covering the hand.
16. Branches of the cutaneous volar branch 9, supplying the proper flexor of the little finger and the integuments covering it.
17. Smaller filaments of the same nerve, which are lost upon the palmar aponeurosis.
18. Continuation of the cutaneous volar branch 9, from which are given off three branches, 19, 20, 21, to be distributed through the palmar aponeurosis.

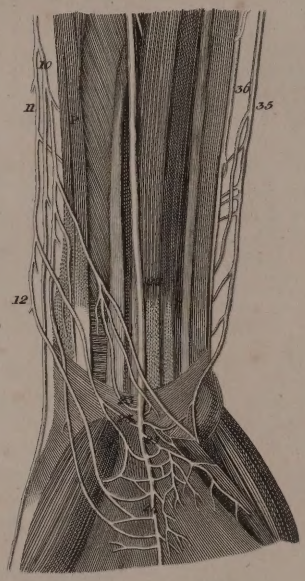
Figure II.

Branch of the radial volar nerve.

1. Flexor carpi radialis muscle.
2. Flexor sublimis muscle.
3. Flexor longus pollicis muscle.
4. Supinator radii longus muscle.
5. Extensor carpi radialis longus.
6. Extensor carpi radialis brevis.

7. Extensor ossis metacarpi pollicis, or abductor pollicis muscle.
8. Extensor primi internodii pollicis, or extensor minor muscle.
9. Extensor secundi internodii pollicis, or extensor major muscle.
10. Abductor pollicis muscle.
11. The radius uncovered.
12. The radial nerve, coming out from under the supinator radii longus muscle.
13 Dorsal branch of 12 cut short.
14. Its anterior branch divides into two smaller branches.
15. Dorsal ulnar nerve of the thumb, coming from branch 14.
16. Anastomosis with the musculo-cutaneous nerve.
17. Small branch cut through which is ramified upon the skin, covering the metacarpal bone of the forefinger
18. Dorsal ulnar nerve of the thumb continued.
19, 19. Anastomoses with the dorsal ulnar and radial nerves
20, 20. Branches cut short which were connected with the dorsal branch of the radial nerve.
21. Branch distributed to the abductor indicis muscle.
22. A cutaneous branch.
23, 23. Filaments distributed to the integuments on the volar aspect of the thumb; these filaments communicate with a branch of the median nerve, also supplying the volar and ulnar aspect of the thumb.
24. Radial dorsal nerve of the thumb, arising from the branch 14.
25. Branch by which it is connected with the musculo-cutaneous nerve.
26. Branch of the radial dorsal nerve 24, descending to the abductor pollicis muscle.
27, 27. Branch 26, anastomosing with nerve 24.
28. Filaments by which it terminates in the abductor pollicis muscle.
29. Radial dorsal nerve of the thumb continued.
30. 30. Small branches which go to the skin, covering the volar side of the thumb, and meet the radial volar nerve.
31, 31. Nervous filaments which disappear beneath the nail.
32. Branch of the musculo-cutaneous nerve cut short.

PL. XXI.



E. Mitchell sculp.t

PLATE XXI.

FIGURE I.

Deeper Nerves of the Right Arm.

A. Head of the humerus.
B. Coracoid process of the scapula.
C, C. The right scapula sawn through and pulled upwards.
D, D. Subscapularis muscle.
E. Anterior portion of the deltoid muscle separated from the clavicle and turned outwards.
F. Portion of the pectoralis minor muscle cut through and raised upwards.
G. Coraco-brachialis muscle.
H. Portion of the biceps humeri muscle cut through and separated from the inferior portion 1. K, its tendon inserted into the radius.
L. Portion of the triceps muscle.
M. Superior portion of the pronator radii teres muscle cut through and laid over to the ulnar side of the arm. N, its inferior portion.
O. Superior portion of the flexor sublimis muscle.
P. Supinator longus muscle.
Q. Brachial plexus of nerves.
1. Supra-scapular nerve passing through the notch in the superior costa of the scapula towards the fossa supra-spinata.
2. Musculo-cutaneous nerve. 3, Branches of it piercing the pectoralis minor muscle. 4. 4. Where it passes through the fibres of the coraco-brachialis muscle. 5, Branches which go to the biceps muscle. 6, 6. Other branches distributed to the superior portion of the brachialis muscle.
7. Anastomosis between a branch of the musculo-cutaneous and median nerve.
8, 8. Musculo-cutaneous nerve continued.
9, 9, 9. Branches distributed to the integuments cut short.
10. Division of the principal trunk of the musculo-cutaneous nerve. 11, Branch passing downwards, distributed to the skin of the thumb. 12, Another branch which separating into filaments anastomoses with branches of the median nerve.
13. Radial nerve, where it runs on the posterior surface of the humerus.
14, 15. A branch of it coming out anteriorily between the brachialis and supinator longus muscles.
16, Median nerve. 17, Remarkable branch distributed to the pronator radii teres muscle. 18, Another to the flexor sublimis muscle. 19, Branches to the inferior portion of the pronator teres muscle alone. 20, Internal interosseous plexus. 21, Filaments of the median nerve, which pass through the flexor sublimis muscle.
22. Long volar cutaneous branch of the median nerve.
23, 23. Anastomoses between it and branches of the musculo-cutaneous nerve.

24. Volar plexus, composed of a branch of the median volar nerve, and branches of the musculo-cutaneous nerve.
25. Branch distributed to the skin and aponeurosis covering the volar aspect of the hand.
26. Ulnar nerve.
27. Branch going to the triceps muscle.
28. Part where the ulnar nerve descends behind the internal condyle of the humerus.
29. Internal cutaneous nerve. 30, A branch of it which anastomoses with the musculo-cutaneous nerve.
31. Branch distributed to the pronator teres muscle.
32. Branches to the flexor sublimis muscle.
33. Branches penetrating the flexor carpi ulnaris muscle.
34. Dorsal nerve arising from the internal cutaneous nerve distributed to the skin, covering the back of the arm.
35. Lesser volar branch. 36. Greater.
37, 37, 37. Distribution of the subscapular nerve.
38. Shows the course of the circumflex, or articular nerve, amongst the fibres of the deltoid muscle.

Figure II.

Gives the course of the Median Nerve in the Arm and Hand.

A, B. Portions of the pronator radii teres muscle, a great part of it being removed.
C. Inferior extremity of the biceps muscle cut.
D. Tendon of the flexor carpi radialis muscle cut.
E. Tendons of the flexor sublimis muscle.
F. Supinator longus muscle.
G. Flexor carpi ulnaris muscle.
H. Deep flexor muscle of the fingers.
1. Trunk of the median nerve.
2. Branches distributed to the flexor profundus, and flexor carpi ulnaris muscles.
3. Branches to the flexor carpi radialis muscle.
4. Internal interosseal nerve.
5. Branches of it going to the flexor longus pollicis muscle.
6. Twig to the flexor profundus muscle.
7. Branches which terminate in the pronator quadratus muscle.
8. Long cutaneous branch.
9. Median nerve continued.
10. Branches of it going to the flexor, abductor, and opponens muscles of the thumb.
11. Radial volar branch of the thumb.
12. Nerves distributed to the integuments covering the thumb.
13, 13. Anastomoses between the radial volar and ulnar nerves of the thumb.
14. Nervous nail-formed arch of the thumb.
15. First common digital branch which 16, 16, increases the ulnar and volar nerve of the thumb, and 17 the radial nerve of the forefinger.
18. Nerves for the first lumbricalis muscle.
19, 19. Twigs which pass to the dorsum of the index-finger.
20, 20. Nervous arch, by means of which, the radial volar and radial ulnar nerves of the forefinger are connected.
21. Nervous nail-formed arch of the index finger.
22. Second common digital branch, which gives a nerve, 23, to the volar ulnar side of the forefinger, and another, 24, to the radial volar side of the middle-finger.
25, 25. Twigs distributed upon the dorsum of the middle-finger.
26. Third common digital branch which gives off the nerve 29 for the ulnar side of the middle-finger, and branch 31 to the radial side of the ring-finger.
27. Remarkable anastomosis between the median and ulnar nerves.
28. Branch to the third lumbricalis muscle.
30. Anastomosis of the second digital branch of the median nerve with a branch, 36, of the ulnar nerve.
32. Ulnar nerve.
33. Its deep branch.
34. Twigs proceeding to the abductor and flexor parvus muscles of the little finger.
35. Nerves distributed to the palmaris brevis muscle.
36. Volar ulnar nerve of the fourth finger.
37. Radial volar nerve of the little finger—38, volar ulnar nerve of the same finger.
39. Anterior branch of the radial nerve, running close to the artery of the same name.

PL. XXII.

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PLATE XXII.

FIGURE I.

Radial Nerve exposed on the Posterior Surface of the Arm.

A. Head of the humerus.
B. Posterior surface of the scapula turned upwards.
C. Deltoid muscle.
D. Longer head of the triceps muscle.
E. Second head of the triceps cut through, that the radial nerve may be exposed.
F. Biceps muscle.
G. External condyle of the humerus.
H. Extensor carpi radialis longus muscle.
I. Extensor carpi ulnaris muscle.
K. Supinator brevis muscle.
L. Extensor longus pollicis muscle, cut short. N. its tendon.
M. Abductor longus pollicis muscle.
O. Trunk of the median nerve.
P. Ulnar nerve.
Q, 1. Radial nerve.
R. A remarkable branch of it, distributed to the second head of the triceps muscle: 2. Another branch to the brachialis muscle.
3, 4, 4. Superficial dorsal branch, which at 5, divides into 6, a branch to the abductor longus pollicis muscle, and 7, which inferiorly disappears through the cellular texture of the forearm.
8. Deep branch of the radial nerve.
9. A branch of it to the supinator brevis muscle.
10. Branch cut short, which went to the extensor muscle of the fingers.
11, 12. Two branches, one of which 11, goes to the extensor carpi ulnaris muscle; the other 12, to the extensor longus pollicis muscle.
13. A branch of the external interosseous nerve, it gives a twig 14, to the abductor longus pollicis muscle, then descending 15, makes its appearance deeper seated.
16. Trunk of the external interosseous nerve; 17, is divided into various branches; 18, some are implanted into the abductor longus pollicis muscle (extensor ossis metacarpi pollicis;) 19, one descends and gives branches to the adjoining cellular tissue, and at length 20, terminates in many filaments, which are distributed partly to the capsular membrane surrounding the joints, partly to the common dorsal membrane of the hand, and also to the interosseous muscles.
21. Circumflex or articular nerve; 22, branch which runs partly through the deltoid muscle, partly through the teres minor; 23, branch to the longer head of the triceps muscle; 24, branch to the infra-spinatus muscle.

Figure II.

Superficial Nerves on the Dorsum of the hand.

1. Dorsal branch of the ulnar nerve.
2. Branch anastomosing with the middle branch of the cutaneous nerve 9.
3. Common trunk of 4, 7, the dorsal ulnar nerve of the ring-finger; and of 6, the nerve for the radial side of the little finger; also of the branch 5, which joining with branch 21, supplies the nerve 23 for the radial side of the ring-finger.
10. A branch from the musculo-cutaneous nerve, bending round to the lower part of the arm, where uniting with 11, a branch of the radial nerve, first gives off the common dorsal branch 13, from which arise the nerve 14 for the radial side of the index-finger; and 15, supplying the ulnar side of the thumb; it then gives off the nerves 16 and 19, which again distribute a branch 17, to the ulnar side of the index; another 22, to the ulnar side of the middle finger; and 18, a branch supplying its radial side.
8. Branch of nerve 1 distributed to the ulnar side of the little finger.

PL. XXIII.

Fig. 1.

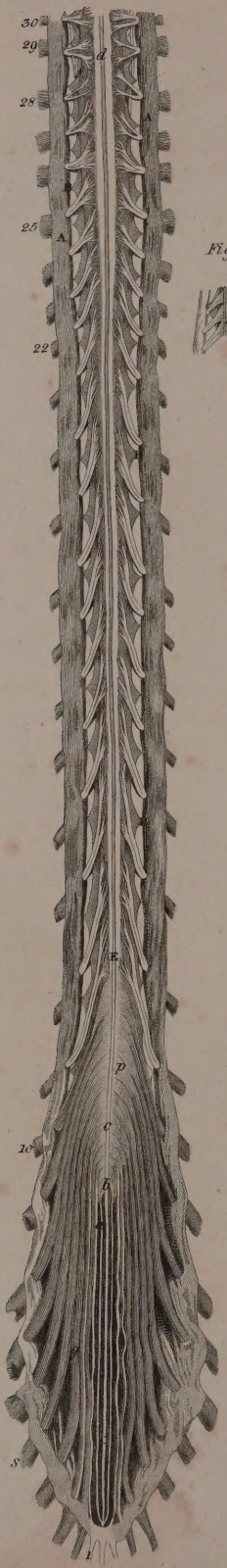

Fig. 4.

Fig. 3.

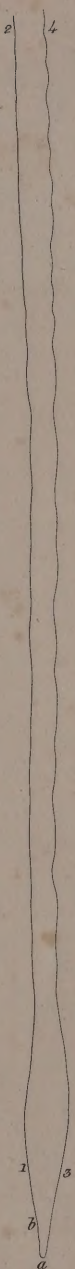

Fig. 6.

Fig. 5.

Fig. 2.

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PLATE XXIII.

Figure I.

Anterior surface of the spinal marrow.

A, A, A. The dura mater divided longitudinally, and reflected on both sides.

B, B. The ligamenta denticulata of the dura mater, attached to all the spaces between the nerves.

C. Ligament continued from the lowest point of the pia mater along with blood-vessels, running out through the middle of the cauda equina, resembling an azygos nerve, and at length terminates in the os coccygis.

a, b. Two eminences resembling ganglia, the one inferior, the other superior, in which the lowest point of the cord ends.

c, d. Anterior middle furrowed line of the spinal cord.

E. Place where nervous filaments begin to run together, and the base of the cauda equina is formed.

f. Accessory nerve.

g. Cauda equina.

1—5. Sacral nerves.

6—10. Lumbar nerves.

11—12. Dorsal nerves.

22—25. Nerves which concur in forming the brachial plexus.

23—30. Eight pairs of cervical nerves.

Figure II.

Posterior surface of the same spinal cord.

e, e. Lateral furrows near to the posterior median line in the cervical portion of the cord.

Filaments are seen between the nerves 21 and 22, between those which are marked 22 and 23, as well as between 24 and 25, then between 25 and 26, and 26 and 27, which pass from one pair of spinal nerves to another.

Figure III.

1, 2. Anterior surface of the spinal cord, viewed from the left side.

3, 4. Its posterior surface.

a, b. Two eminences, vid. fig. 1. a, b.

Figure IV. V. VI.

Sections of the spinal cord of a boy four years of age, in the region of the inferior cervical nerves.

IV. Anterior sulcus divided.

l, l. Its lateral portions—*a, a.* bundles of fibres seen in the bottom of the furrow, which connect the sides together.

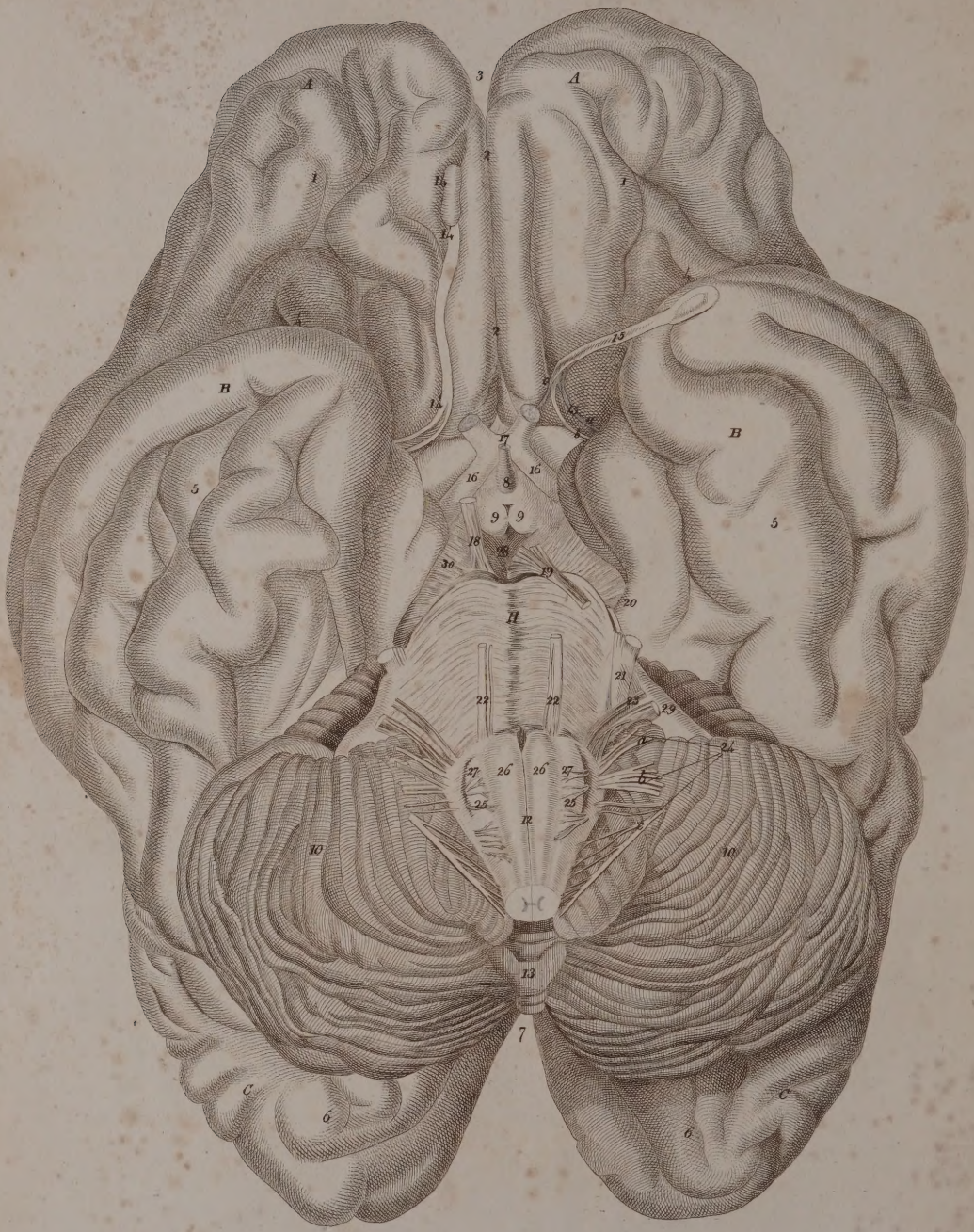
V. Posterior furrow divided—*l, l.* the sides of the furrow—*a, a.* fibres observed in the bottom of the furrow connecting the sides.

VI. Transverse section: *a, a.* nervous or medullary columns: *b,* middle posterior furrow: *c,* another anterior furrow: 1—2. place where the cineritious substance divides the medulla of each column: *i, d,* origin of the anterior roots of the spinal nerves.

2. Their posterior roots passing out from the posterior surface of the cord.

PLATE XXIII.

I. SUPPLEMENTARY PLATE.



E. Mitchell, sculpt.

SUPPLEMENTARY PLATE.

This exhibits the Base of the Brain of the Natural Size.—*(From Soemmering.*)*

A, B, C. The Brain properly so called (*Cerebrum.*)†

1, 1. The anterior lobes of the brain.

2, 2. The line of separation between the right anterior lobe and the left, these being still joined by the pia mater and arachnoid membranes.

3. The hiatus between the right and left anterior lobes, which is filled up by the falx of the dura mater where it is attached to the crista galli.

4. The fissure between the anterior and middle lobes commonly called the fossa of Sylvius.

5, 5. The middle lobes, which always project more downwards than the anterior.

6, 6. The posterior parts of the brain, improperly called by some the posterior lobes.

7. The hiatus which is partly filled by the falx and tentorium of the dura mater.

8. The infundibulum, supported upon the union of the optic nerves.

9, 9. Corpora albicantia.

10, 10. The cerebellum, divided at its base into right and left lobes.

11. The tuber annulare.

12. The medulla oblongata.

13. That part of the cerebellum where the lobes adhere; by some supposed analogous to the corpus callosum. Many call it the vermiform process of the cerebellum. By Vicussens it is called the posterior vermiform process.

14, 14, 14. The right olfactory nerve lying in its natural situation, its roots behind, and its bulbous extremity before. It is bound down to the surface of the brain by the arachnoid membrane passing over it.

15. The olfactory nerve of the left side reflected by merely cutting through the arachnoid membrane, and displacing the nerve.

a, External root.‡

b, Internal root.

c, Superior or cineritious.

16, 16. The optic nerves.

17. The commissure of the optic nerves.

18. The right nerve of the third pair in its natural situation.

19. The left nerve of the third pair thrown aside, that its origins§ may appear more distinct. The radical filaments are collected into one trunk.

20. The left nerve of the fourth pair.

21. The fifth pair.

22. 22. The sixth pair.

23. The seventh pair, composed of the *portio dura* anteriorly, and the *portio mollis* posteriorly.

24. The eight pair, formed of (*a*) the glosso-pharyngeal, (*b*) the par vagum, and (*c*) the spinal accessory.

25. The ninth pair.

26. The corpora pyramidalia.

27. The corpora olivaria.

28. The substantia perforata.

29. The crura cerebelli.

30. The crura cerebri.

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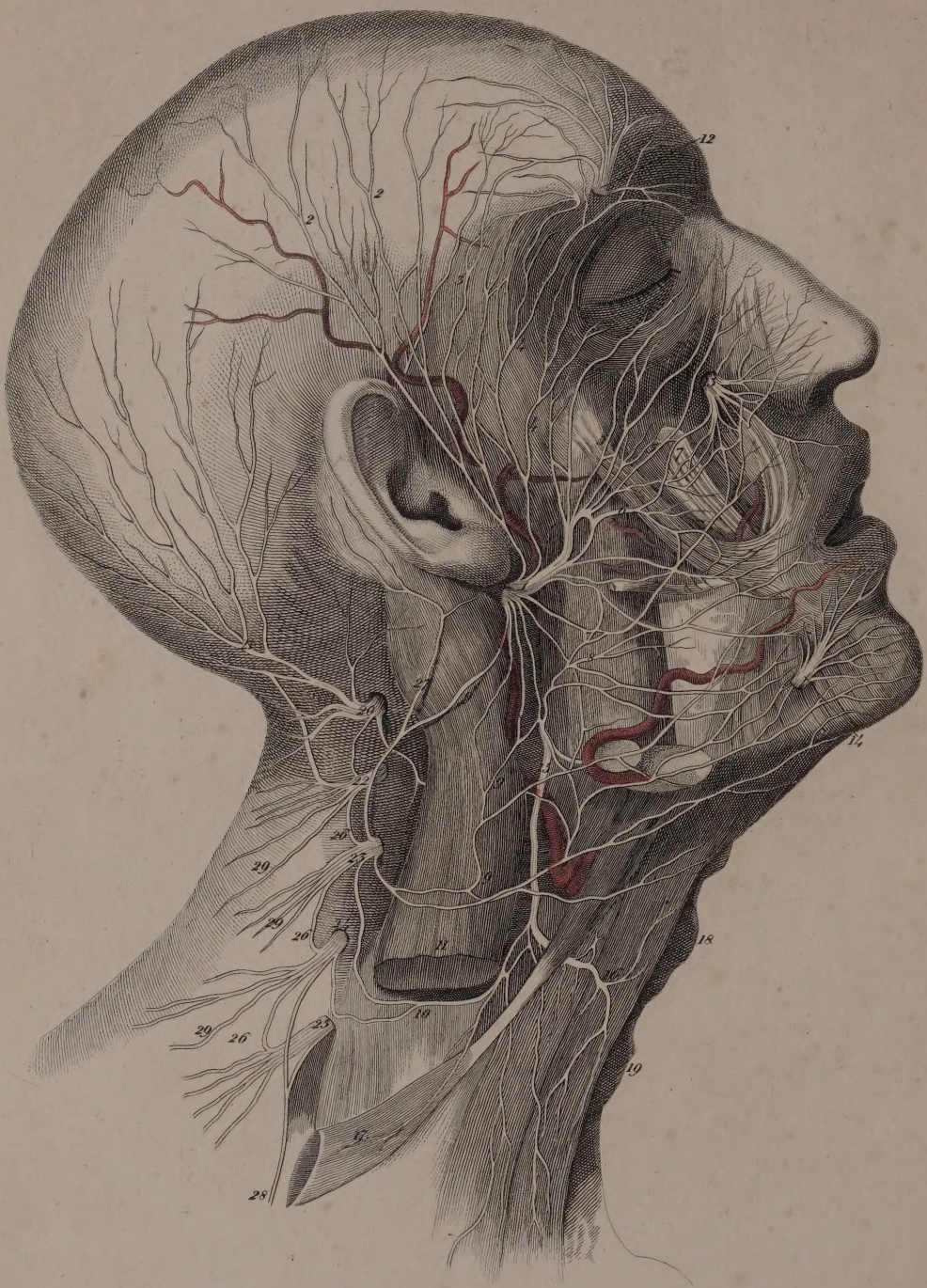
* Much care has been taken by the Author to make this accurate; he has carefully marked all the fissures and convolutions as they existed in nature.

† There is a want of symmetry in this brain, such as is frequently seen in nature, the left side being somewhat larger and fuller than the right.

‡ The student must not suppose, that although he cannot at all times make out these roots of the olfactory nerve, that there is any thing doubtful or ideal in the dissection and description of Soemmering. A pathological case, in which a tumour, growing from, or connected with the dura-mater covering the cribriform plate of the ethmoid bone, pressed on the inferior surface of this part of the brain, showed me the roots of this nerve as distinct and formal as is shown in this plate, and that without the smallest dissection.

§ The word origin is used without any reference to theory, but simply to imply cerebral or central connexion.

II. SUPPLEMENTARY PLATE.



E. Mitchell Sculp.

II. SUPPLEMENTARY PLATE.

This Plate represents the Superficial Nerves of the Face and Neck. The Parotid Gland has been removed, in order to expose the Branches of the Facial Nerve which are imbedded in its substance.

1. Superior or temporo-facial branch of the facial nerve, or portio dura of the seventh pair.
2, 2. Temporal filaments of the same branch which are distributed to the temporal region and summit of the head.
3. Other filaments of the facial nerve extending to the forehead, and anastomosing with the frontal branch of the ophthalmic nerve.
4. Filaments of this nerve to the eyelids.
5, 5. Other filaments proceeding to the side of the nose.
6. Branch of the facial nerve, the filaments of which lose themselves in the muscles of the mouth, and the integuments of the cheek.
7. Anastomosis of the anterior branches of the facial with the infra-orbital nerve. From this anastomosis branches pass off to the muscles of the mouth, and one branch which is lost in the muscles of the wing of the nose.
8. Branches of the facial nerve extending to the angle of the mouth and the muscles of the lower lip: they anastomose with filaments of the mental nerve.
9, 9, 9. Superficial nervous plexus formed on the side of the neck by an anastomosis between the branches of the facial and cervical. From this plexus arise filaments which go to the lower part of the face and the upper and fore part of the neck.
10. Anastomosis formed by the phrenic nerve, the descendens noni, and the facial nerve.
11 Sterno-mastoid muscle cut in its middle.
12. Frontal branch of the ophthalmic nerve, giving some filaments to the upper eyelid, and dividing into branches which separate from one another, and ascend to be distributed to the muscles and skin of the forehead.
13. Infra-orbital nerve. The branches of this nerve are distributed to the muscles and integuments of the nose, cheek, the upper lip and eyelids.
14. The mental nerve. The numerous filaments of this nerve are lost in the muscles and integuments of the lower lip and chin.
15. Descending branch of the hypoglossal nerve. We here see the anastomosis which this nerve forms with the cervical spinal nerves and the phrenic.
16, 16. Filaments which the descendens noni gives to the sterno-thyroid and sterno-hyoid muscles.
17. Twigs of the same nerve to the omo-hyoideus muscle.
18. Projection of the thyroid cartilage.
19. Thyroid Body.
20. First cervical nerve.
21. Ascending branches of the first cervical nerve ramified in the occipital region.
22, 23, 24, 25. Second, third, fourth, and fifth cervical nerves.
26, 26, 26, 26. Filaments by which the cervical nerves anastomose with each other: they concur in the formation of the cervical plexus.
27. Mastoid branch from the cervical plexus.
28. Phrenic nerve.
29, 29, 29. Descending branches of the cervical plexus.

III. SUPPLEMENTARY PLATE.

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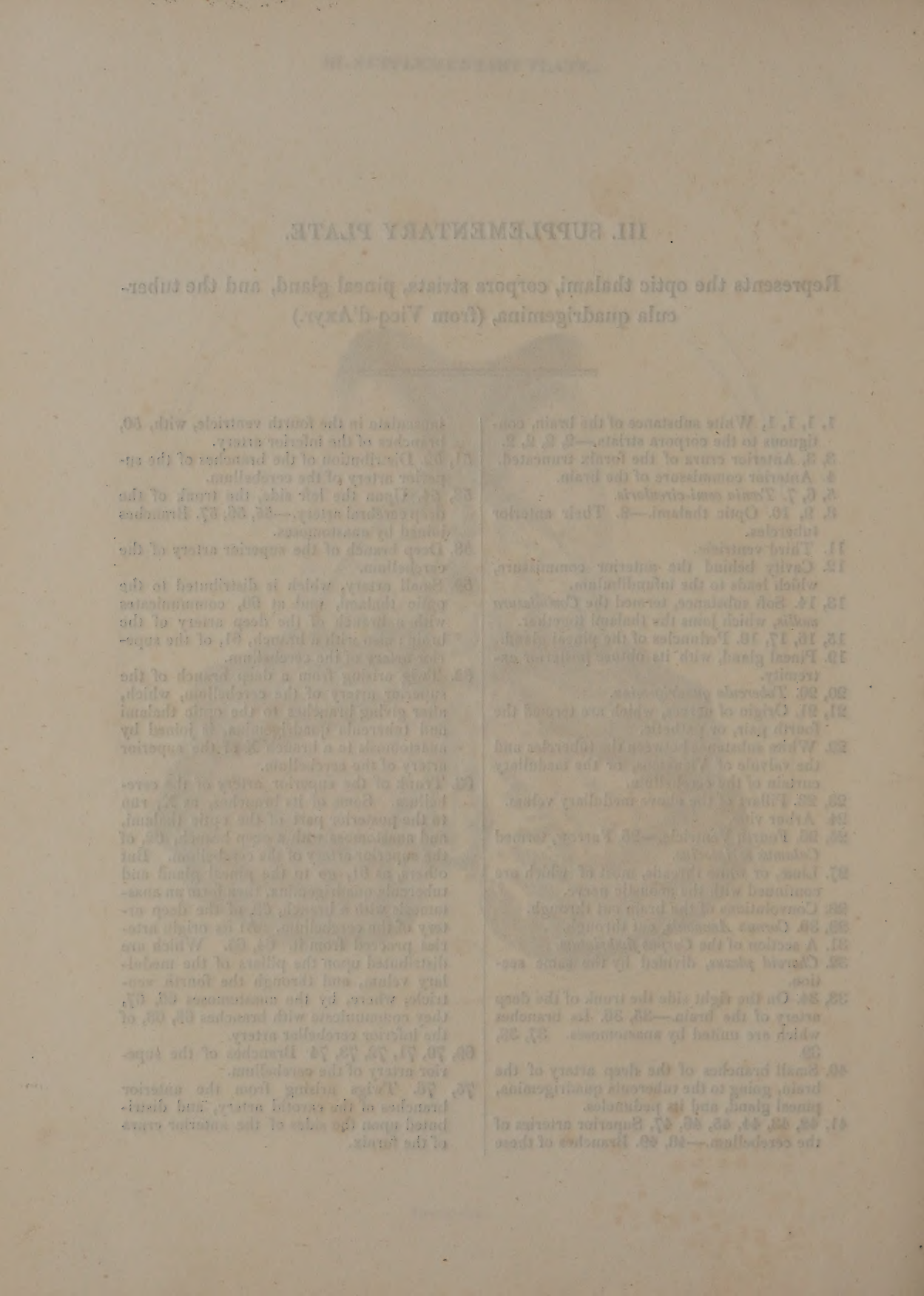
III. SUPPLEMENTARY PLATE.

Represents the optic thalami, corpora striata, pineal gland, and the tubercula quadrigemina, (from Vicq-d'Axyr.)

1, 1, 1, 1, White substance of the brain, contiguous to the corpora striata.—2, 2, 2, 2.
3, 3, Anterior crura of the fornix truncated.
4. Anterior commissure of the brain.
5, 6, 7. *Tænia semi-circularis.*
8, 9, 10. Optic thalami.—8. Their anterior tubercles.
11. Third ventricle.
12. Cavity behind the anterior commissure, which leads to the infundibulum.
13, 14. Soft substance, termed the *Commissura mollis*, which joins the thalami together.
15, 16, 17, 18. Peduncles of the pineal gland.
19. Pineal gland, with its obtuse posterior extremity.
20, 20. *Tubercula quadrigemina.*
21, 21. Origin of nerves, which are termed the fourth pair, or pathetic.
22. White substance between the tubercles and the valvule of Vieussens, or the medullary curtain of the cerebellum.
23, 23. Pillars of the above medullary velum.
24. Arbor vitæ.
25, 26. Fourth Ventricle.—26. Furrow, termed *Calamus scriptorius.*
27. Linæ, or white threads, most of which are continued with the acoustic nerve.
28. Convolutions of the brain cut through.
29, 30. *Cornua Ammonis*, cut through.
31. A section of the *Corpus fimbriatum.*
32. *Choroid plexus*, divided by the same section.
33, 34. On the right side the trunk of the deep artery of the brain.—35, 36. Its branches which are united by anastomoses. 37, 38, 39.
40. Small branches of the deep artery of the brain, going to the tubercula quadrigemina, pineal gland, and its peduncles.
41, 42, 43, 44, 45, 46, 47, Superior arteries of the cerebellum.—48, 49. Branches of these inosculate in the fourth ventricle, with, 50, branches of the inferior artery.
51, 52. Distribution of the branches of the superior artery of the cerebellum.
53, 54. Upon the left side, the trunk of the deep cerebral artery.—55, 56, 57. Branches joined by anastomoses.
58. Deep branch of the superior artery of the cerebellum.
59. Small artery, which is distributed to the optic thalami, and at 60, communicates with a branch of the deep artery of the brain: also with a branch, 61, of the superior artery of the cerebellum.
62. Twig arising from a deep branch of the superior artery of the cerebellum, which, after giving branches to the optic thalami and tubercula quadrigemina, is joined by anastomosis to a branch X of the superior artery of the cerebellum.
63. Trunk of the superior artery of the cerebellum. Some of its branches, as X, run to the posterior part of the optic thalami, and anastomose with a deep branch, 62, of the superior artery of the cerebellum. But others, as 61, go to the pineal gland and tubercula quadrigemina, then form an anastamosis with a branch, 59, of the deep artery of the cerebellum. At its origin arteries proceed from it. 64, 65. Which are distributed upon the pillars of the medullary velum, and through the fourth ventricle, where, by the anastomoses 66, 67, they communicate with branches 68, 68, of the inferior cerebellar artery.
69, 70, 71, 72, 73, 74. Branches of the superior artery of the cerebellum.
75, 76. Twigs arising from the anterior branches of the carotid artery, and distributed upon the sides of the anterior crura of the fornix.

III. SUPPLEMENTARY PLATE.

Represents the optic thalami, corpora striata, pineal gland, and the tubercula quadrigemina. (from Vieq-d'Azyr.)



IV. SUPPLÆMENTARY PLATE.

Edinburgh Scalpt

IV. SUPPLEMENTARY PLATE.

From the work of F. I. Gall and Spurzheim on the Anatomy and Physiology of the Nervous System in general, and particularly of the Brain.

1. Left lobe of the cerebellum.
2. Nervous mass of the vertebral column.
3, 3. The restiform body, or the continuation of the cerebellum with the medulla oblongata. Gall gives the name of primitive fasciculus of the cerebellum, to that portion which passes between the facial nerve, 4, and acoustic, 5.
6, 6. The body by which the cerebellum is joined to the brain; or the anular protuberance, is formed by transverse fibres.
7. Mixed pair of nerves, or nervi trigemini covered, by the transverse fibres of the cerebellum: 8, 9, the same pair of nerves exposed on the other side by the removal of these fibres.
10, 10. Olivary ganglion, or olivary bodies.
11. Commencement of the pyramidal fasciculus of the brain, whose fibres 12 by degrees diverge and become more numerous.
13. Continuation of the same fibres into the anular protuberance.
14. Right optic nerve cut off.
15. Fourth pair of nerves, or the nerve for the superior oblique muscle of the eye.
16. Medullary processes of the brain, or *crura cerebri.*
17, 18, 19, 20, 21. Transverse and complex intermixtures: 17, those which belong to the greater commissure of the cerebellum: 18, to the crura of the brain: 19, which lie under the tractus opticus: 20 21, which are proper to the greater and superior ganglion of the brain.
22, 22. Corpus striatum.
23, 23. Posterior part of the lateral ventricle.
24. Process of the greater and superior ganglion of the brain, that is, white fibres of the corpus striatum.
a, a. Nervous fibres going to the middle lobe of the brain, made clear by dissection.
25, 25. Mammillary eminences, or *corpora candicantia.*
26. Grey substance which is behind the commissure of the optic nerves.
b. Crura of the corpora candicantia.
c, d, e. Left optic nerve; *c* the *corpus geniculatum externum.*
27. Commissure of the optic nerves, or *corpus quadrilaterum.*
28. The optic nerve leaving that body and going to the left eye.
29. Anterior commissure of the brain, or anterior junction of the middle lobe.
30, 31. Middle lobe of the brain, *f, f,* a section of it.
32, 32. Right lobe of cerebellum cut through.
g. Ganglion of the cerebellum or *corpus dentatum.*

V. SUPPLEMENTARY PLATE.

F. Mitchell Sculp.

V. SUPPLEMENTARY PLATE.

Represents the greater commissure of the cerebellum or anular protuberance, anterior commissure of the brain, also the convolutions of the anterior lobe. (From Gall and Spurzheim.)

3, 3, 10, 10, 11, 12. See IV. Supp. Plate.
1, 1. Horizontal section of the cerebellum.
2. Ganglion of the cerebellum or *corpus serratum.*
4, 4. Nervous fibres of the cerebellum.
5. Median line of the whole brain.
6, 6, 7, 14, 16, 19, 22, 24. See IV. Supp. Plate.
8. Bundle of transverse fibres running before the optic nerves.
9. *a.* Anterior commissure of the brain, or of the middle lobe.
13. Anterior portion of the right optic nerve turned back.
c. Where the optic nerve is joined to its fellow of the other side.
15. Optic nerve proceeding under the crura of the brain.
17. *Pes hippocampi.*
18. *d.* 20. Roots of the olfactory nerve, 21, its ganglion.
25. *b.* See IV. Supp. Plate.
23. Interior portion of the superior ganglion of the brain, that is, of the *corpus striatum.*
26. Where the interior root 20, of the olfactory nerve, adheres to the inferior and anterior extremity of the *corpus callosum.*
27. Anterior extremity of the corpus callosum, which joins together the inferior convolutions of both anterior lobes.

VI. SUPPLEMENTARY PLATE.

R. Mitchell, sculpt.

VI SUPPLEMENTARY PLATE

From Gall and Spurzheim.

The brain placed upon its base ; the section made from above, passes through the middle of the great commissure C, D, D,—as far as the cerebral appendage 1,—situated under the anterior commissure 2,—and as far as the tubercula quadrigemina 3, 3, 4, 4,—then through the middle of the fundamental part of the cerebellum *a*, *(corpus serratum* or *Rhomboideum,)* and through part of the mass of communication 5, 6,—with the tubercula quadrigemina, (the mass of communication means the valvule of Vieussens.) The two hemispheres are separated and unfolded. The furrows 7, 7,—refer to the lateral *e*, *e*,—P. ii. Fig. ii., and 8—to the median fissure *d*. The interval 9,9,9,9,—situated before the *corpus dentatum* of the cerebellum is open ; it is in connexion, by means of a sort of canal under 10, 11,—with the interval 12—in the middle of the great inferior cerebral ganglion 13, 13, (the interval 12—means the space between the thalami, and the great inferior cerebral ganglion 13, 13,—are the thalami themselves, the passage of communication referred to, between 9, 9, and 13, 13—is consequently the *iter a tertio ad quartum ventriculum*, or aqueduct of Sylvius.) The septum and the common mass of communication are cut at 14—on both sides and removed entirely, in order to expose the great cerebral ganglions 13, 13, and 15, 15, (meaning the *thalami nervorum opticorum* and *corpora striata.)* A, referring to the left side of the brain, may be seen the whole inferior surface of the cerebellum cut vertically through the middle. B, referring to the right side of the brain, there has been removed from off the cerebellum by a horizontal section from within outwards and from before backwards, and on a level with the white fibres 16—situated in the fourth ventricle, the fundamental part, and what one sees upon the anterior surface on the opposite side of the brain. A vertical section has removed the anterior and internal part of the right hemisphere, showing the diverging direction of the nervous fasciculus above the great inferior ganglion ; the extremely fine filaments of the grey substance ; the great fasciculi 17—in the middle ; the division of this mass of grey substance in the internal part 18—and the external 19,—also the comparative size of each of its divisions.

R. Mitchell sculpt.

VII. SUPPLEMENTARY PLATE.

From Vicq D'Azyr, showing the Arteries of the Brain.

1, 1. Internal carotid or cerebral arteries cut through.

2, 2. Ophthalmic arteries.

1, 3. Arch of the carotid artery which gives off the anterior choroid branch 54—running towards the choroid plexus of the ventricles; another, 47, the communicating artery of Willis which is continued with the branches 46, 48, coming from the basilar artery.

4, 4. Anterior branch of the carotid which gives the vessels 5, 5 to the optic nerves and to the roots of the olfactory nerve.

6, 7, 8. The arteries of the corpus callosum; they divide at 9, 10 into the inferior branches of the brain, nourish the olfactory nerve, and communicate with the extreme branches of the Sylvian artery.

11, 12. Internal and anterior cerebral branches of the artery of the corpus callosum.

8, 8. Arteries of the corpus callosum going to its superior surface.

15, 16. External carotid branch or Sylvian artery, which divides into three branches 17, 18, 19, the middle branch 18, occupies the fissure of Sylvius. From this artery the middle and lateral arteries of the brain proceed 20, 21, 22, which are joined by anastomoses 23, 24, with the deep arteries of the brain, and at 25 with branches of the artery of the corpus callosum.

26, 26. Vertebral arteries entering the cranium and coming together to form the basilar artery 27, 28, which runs under the annular protuberance.

29, 29. Twigs going to the roots of the lingual nerve.

30, 31. Inferior and greater artery of the cerebellum 32, 33, branches of it.

34, 35, 36. Anterior spinal arteries: 35 Anastomosis of the right spinal artery with the left.

37, 38, 39. Deep lesser artery of the cerebellum on the left side: 40, 41, 42, the same artery on the right side.

43, 43. Superior artery of the cerebellum: 44, 45, branches of it, communicating with twigs of the lesser deep artery of the cerebellum.

46, 46. Deep artery of the brain, or the posterior and deep artery of *Haller*, from which the communicating artery 47, 47, arises, also the branches 48, 49, 50, 51, 52, 53.

54. Anterior communicating artery which completes the circle of Willis.